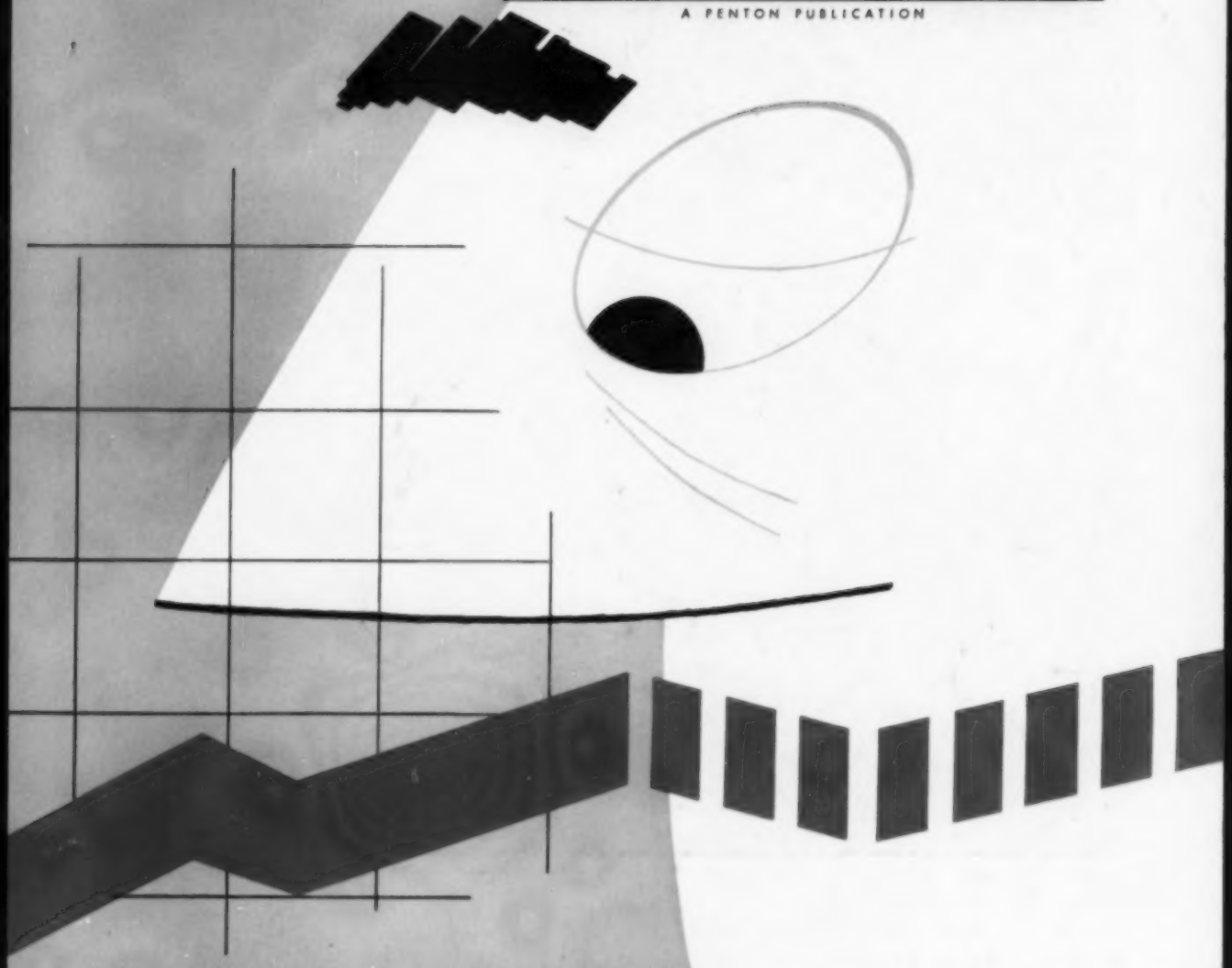
JUNE 25, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

✔ Make Silver Brazing Pay Off —page 80

✔ Surprises in Red Steelmaking —page 88



Will the Boom Last?

Metalworking managers appraise midyear softening. Find strength in capital goods and construction more than offset weakness in consumer items. Expect new records in '56 —page 47

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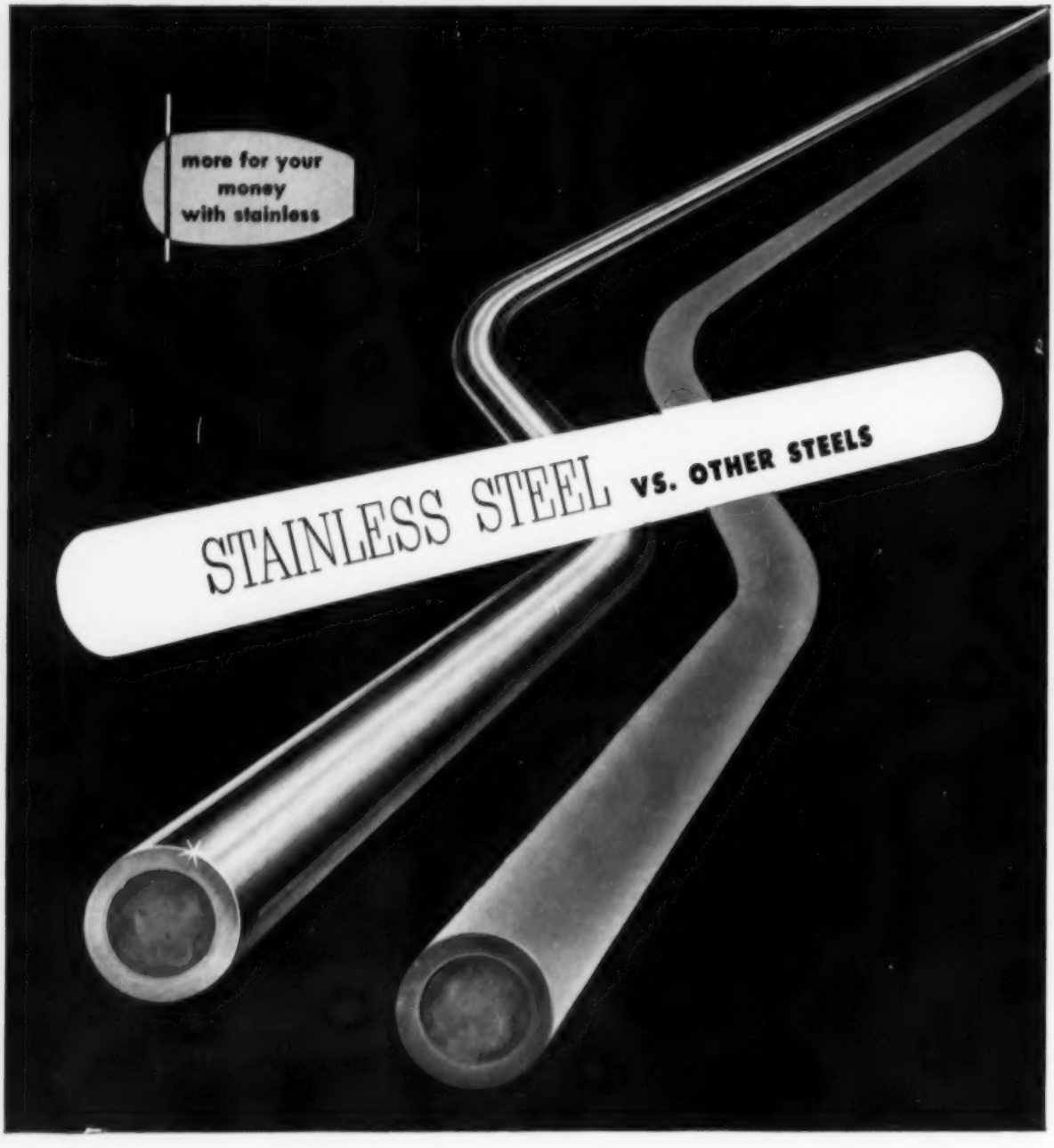

Regardless of present conditions it is often difficult to predict future operating requirements. A generous safety factor should be allowed for all possible conditions of corrosion, oxidation, pressures and temperatures. In the range of B&W stainless steels will be found the answers to virtually all of these conditions. It's easy to anticipate substantial savings in downtime and labor costs in replacing worn-out tubing made from less hardy metals. Be sure with B&W stainless.

Get in touch with Mr. Tubes, your link to B&W, for the story of how you can get more for your money with stainless tubing. *Or write for Bulletin TB 1.*

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Milwaukee, Wis.: Seamless Welding Fittings

TA-5035(P)

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The local distributor of steel products is today's industrial Minute Man. To render the type of service his customers expect, he must be ready for anything, including daily requests for emergency help.

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Throughout the country, distributors are geared for this kind of service. It's their business to carry large inventories of sheets, strip, bars, plates, structurals, tool steel, wire rope, and other essential items; inventories so large that emergency calls can be taken in stride. For the buyer of steel in small and moderate quantities, these inventories, plus quick deliveries, are often the answer to major production problems.

But stocks and deliveries are only a part of the story. You'll find that distributors can be of help in other ways. For instance, they are equipped for handling and processing steel—for shearing, slitting, edging, sawing, flame-cutting, and similar operations. You can turn to them for expert technical advice. In some cases, they can even run tests for you in laboratories of their own.

You'll enjoy knowing the Bethlehem distributor nearest you. He's friendly, cooperative. His middle name is Service, and he'd like the chance to show you why.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
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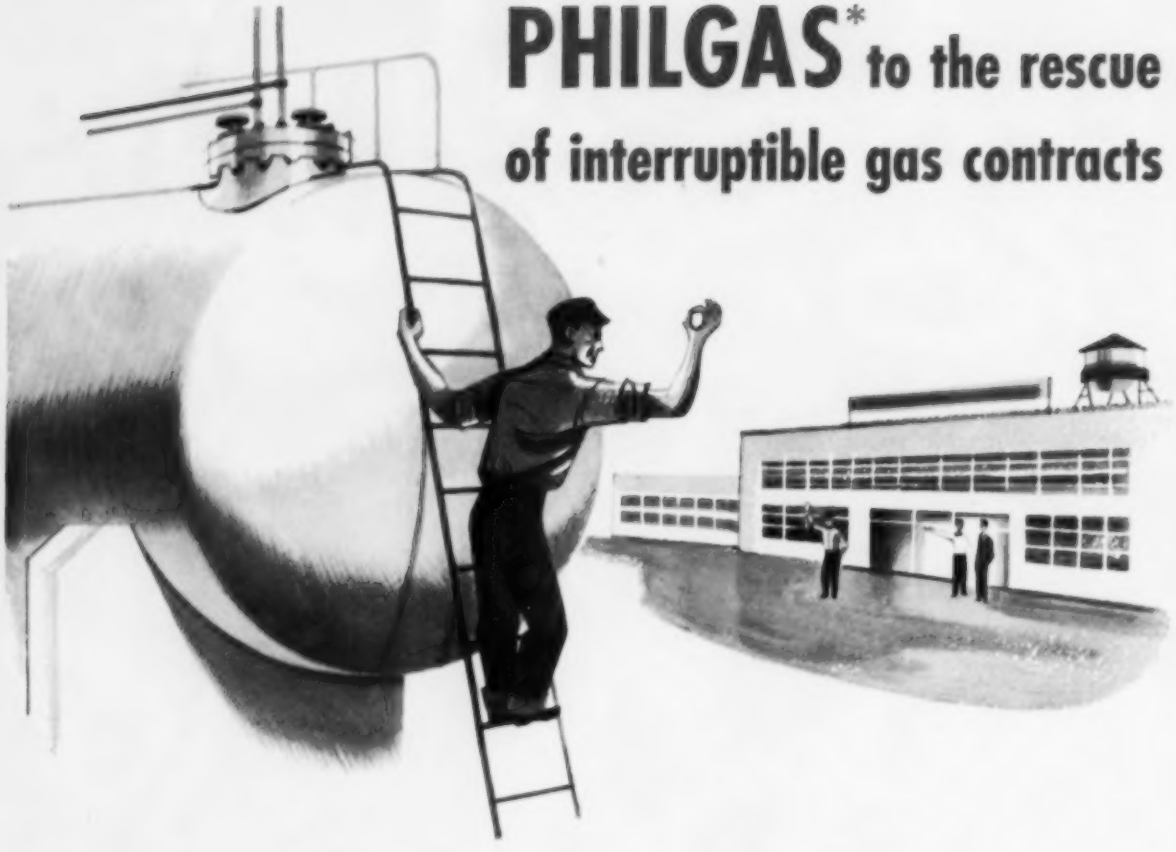
BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

PHILGAS* to the rescue of interruptible gas contracts



Your own Philgas system helps avoid shut-downs during peak demands

It will pay you to have a standby Philgas system installed now and be ready for emergencies. Philgas is simple to install . . . requires little capital outlay . . . can be put into operation on short notice. Because a Philgas system is automatic, there are no additional labor costs. It's like having your own gas well!

Philgas is a high-quality Phillips Petroleum Company product that you can absolutely rely on for cleanliness, uniformity and high thermal value. Philgas contract customers are assured of a dependable source of supply at all times. Write for full information about Philgas, America's largest selling LP-Gas.

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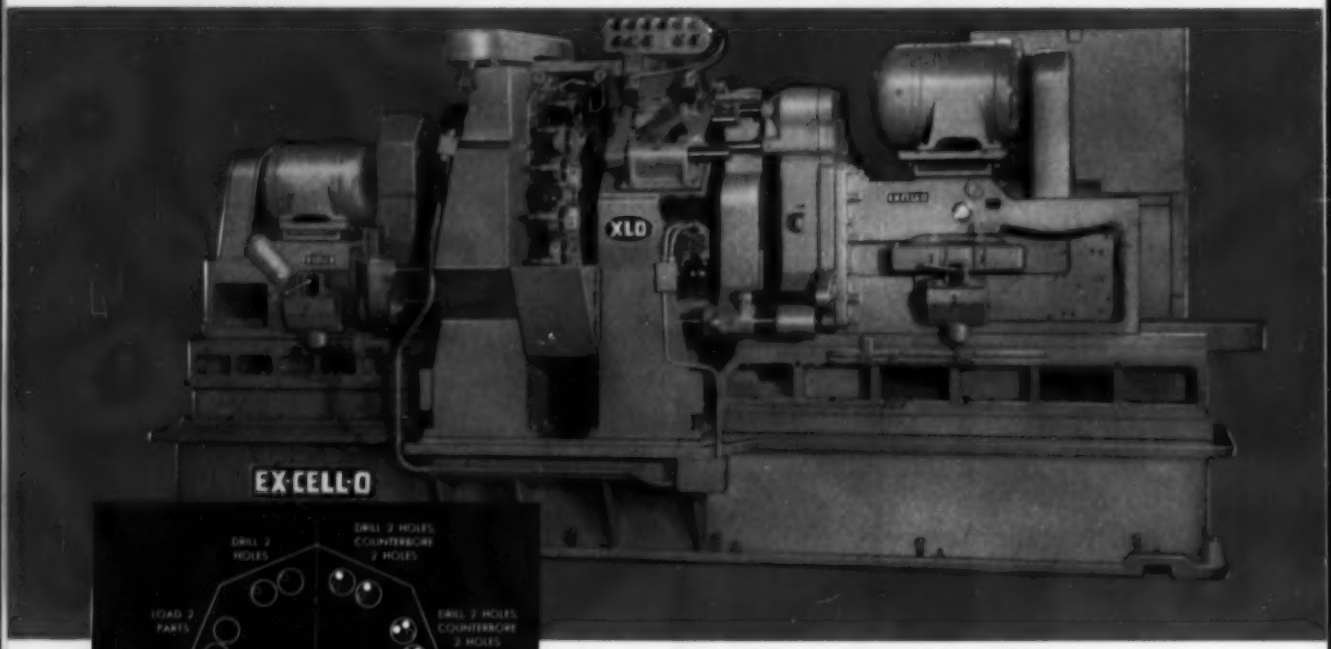
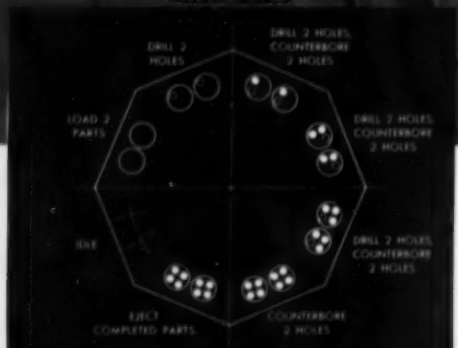
SPECIAL EX-CELL-O MACHINE

Drills and Counterbores 514 Rocket Nozzles per Hour





This diagram shows the progressive operations. At station 7, parts are automatically ejected.

Front and rear view of completed part. The rocket nozzle is tough forged steel; location of holes to each other and to the four pronged slots is critical.

Here's another Ex-Cell-O solution to a hard-to-handle machining job. Rocket nozzles are small, tough steel forgings. For the drilling and counterboring operations—shown in diagram—critical dimensions must be held.

Ex-Cell-O designed and built this special machine with a trunnion fixture that indexes through eight stations. Two Standard Ex-Cell-O Slide Type Hydraulic Power Units—one for drilling, the other for counterboring—actuate the multiple spindle heads. Features of the machine include simplified design, high productivity, safety and sturdiness. . . . When you're faced with a tough machining problem, call in Ex-Cell-O.

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CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

56-28

STEEL
The Metalworking Weekly

JUNE 25, 1956
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Editorial & Business Staffs, 16. Advertising Index, 145. Editorial Index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 W. 39th St., New York 18, N.Y.

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U. S. and possessions, Canada, Mexico, Cuba, Central and South America, $10 a year, other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.

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St. Paul 2, Minn.

behind the scenes

Executive Swamis

Each year when the sun crawls the last few degrees of latitude toward high summer, the editors of STEEL seek out the opinions of metalworking management on business prospects. This year they asked: "How good will the metalworking business be in the second half of 1956? Will the boom which has characterized the first half continue? Will it level out? Or will it decline?"

Questionnaires are sent to representative management all over the country. At the risk of letting the cat out of the bag, we'll release this much of our own confidential information: 5000 questionnaires were sent out, and more than 1250 were returned and processed. That's more than a 25 per cent return, which, in itself, is quite remarkable. But most remarkable is the consensus of more than 1000 executives.

Their thinking is sampled twice a year, and it is interesting to compare opinions spaced six months apart. Do the boys hedge? Do they recant, enlarge, recapitulate or really go overboard? These are some of the reasons explaining the annual interest in STEEL's Midyear Forecast (page 47).

At the first of the year, management anticipated a 6 per cent rise in employment; now it is more inclined to accept a 3 per cent figure. Conversely, it pegged the production of electrical machinery at an increase of 3 per cent, and now has revised that estimate to 6 per cent.

The report reflects a mild balance of optimism and pessimism, a sort of cautious reappraisal of metalworking prospects. You will find the article helpful and instructive.

Sales Eye Openers

The sun crawling up to the Tropic of Cancer reminds us of an item about blinking. Sometimes, mere *mention* of a bright sun sets our rheumy little eyes to watering. There's an outfit in New York called "The Institute for Motivational Research," directed by Dr. Ernest Dichter. This organization employs psychoanalysis, psychology and associated strategems of all social sciences to discover what prompts persons to buy things—and, more importantly, what prompts them not to buy.

It learned, for instance, that women shied away from buying canned soup because the action stirred up a guilt complex; so it suggested that canned soup advertisers should illustrate their ads with folksy old bats peeling potatoes in their laps. It discovered, too, that the average person blinks at the rate of 32 blinks per minute. When he sees something he likes, the rate drops to 14 bpm; no tension, you see. By spying on customers, sales agents can estimate a customer's sales resistance right down to the wink of an eye. Yet some people say there ain't no science in selling!

Bottoms Up!

Yandusk Xyalurp, a teacher in Lower Turkeytrot, Upper Pandemonium, rapped his little charges on their collective skulls to bring them to order (and incidentally making like a xylophone) and declared: "My little comrades, a yequil full of gop, selling at 6 joops a quart, is set before a politically backward mujik, who drank it up before you could say the first line of our glorious Constitution. His brother Sanford had just drunk a whole quazink full, and the only way to tell who was the drunkest was to find out who had drunk the most. Now, all we know is that a yequil is just 1 floop deep, but a quazink is 1 glong deep. A floop is exactly 4 glongs long. The top of a yequil is 1 square glong, while the top of a quazink is 1 square floop. First one of my little comrades in with the correct answer receives a dozen sticks of dynamite and some free lessons in sabotage."

Shrdlu

(Metalworking Outlook—Page 41)

Wyman-Gordon fuselage frame forging ready for quality inspection with Immerscope. Wyman-Gordon chooses the Curtiss-Wright test system to assure highest quality for parts which must later meet extreme stresses in fighter aircraft.

CURTISS-WRIGHT IMMERSCOPE PROVES SOUNDNESS OF FORGINGS BEFORE SHIPMENT FOR WYMAN-GORDON

New Curtiss-Wright Immerscope (Model 424-A) protects quality of forgings, rolled plate, welded tubing, extrusions and other metal products. Complete with controls for gate width and depth, alarm trigger, and sensitivity time control. 400 w, 110-120 v, 60 cycle. 16"x15"x21½". Operates at 2.25, 5, 10, 15 and 25 megacycles.

Non-destructive, ultrasonic test equipment guards your reputation for quality

An ultrasonic "search crystal" passed back and forth over a forging immersed in water "sees" through the metal, using electrical vibrations of up to several million cycles a second. Internal flaws are shown as "pips" — visible readings reported on the cathode ray of the precision Curtiss-Wright Immerscope. This ultrasonic detective sounds out variations from metal specifications . . . provides for thorough inspection before or after machining. Production is speeded, costs lowered. Customers receive quality controlled shipments every time.

Put ultrasonics to work for you. Write for full details and engineering assistance to Industrial and Scientific Products Division, Curtiss-Wright, P.O. Box 270, Caldwell, N.J.

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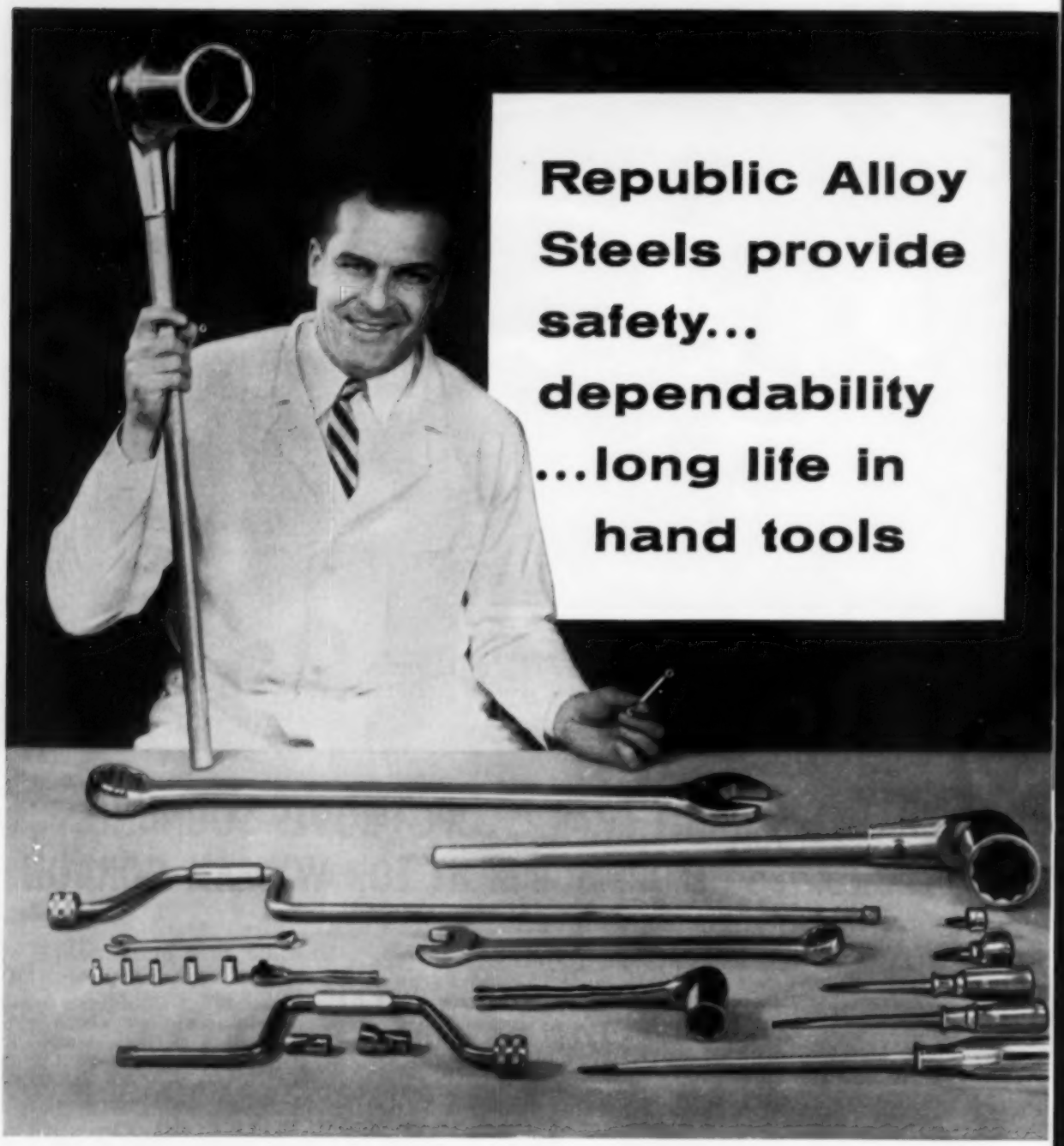

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REPUBLIC STEEL

World's Widest Range of Standard Steels

To maintain today's peak production schedules, workmen's hand tools used for assembly, maintenance or repair of equipment must be of high quality. They must be safe and dependable to meet the increased emphasis on the elimination of lost time accidents. They must have long life because production shops keep accurate records on the hourly life of these tools and insist on the ones that last the longest.

Republic Alloy Steels provide tool manufacturers with a combination of qualities essential in the production of socket wrenches, box and open end wrenches, speed handles and screw drivers.

Alloy steels offer a greater degree of safety than other materials because they can be tempered to a greater depth. They can also be heat treated at higher temperatures. Their response to heat treatment is such that uniform structures can be formed in tools where the section mass changes abruptly, as in box wrenches. Higher draw temperatures and greater depth of penetration make a tool that is tougher, able to stand up in severe service.

One additional requirement of the modern hand tool is that it be strong, yet easy to handle. Here again alloy steels fit the bill. Their high strength-to-weight ratio permits the use of thinner sections to hold down size and save weight —without any sacrifice of needed strength.

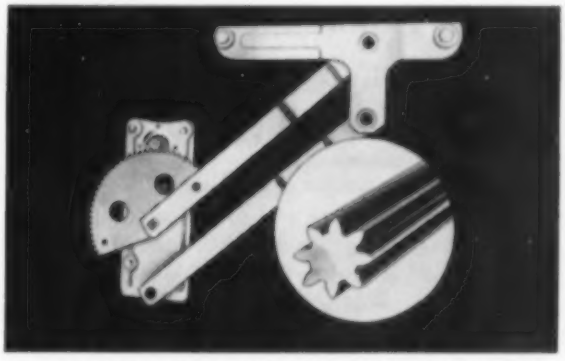
Now, what about your product? Republic metallurgists and engineers are ready to give you obligation-free assistance in the application of these fine steels to your product—assistance that can insure safety, extend equipment life, reduce maintenance and replacement costs. Mail the coupon today.

The tools shown at left were made from Republic 4140 Hot Rolled Alloy Steel Bars by The Cornwell Quality Tools Company, Mogadore, Ohio. This manufacturer has used alloy steels for more than 30 years.

STEEL

and Steel Products

REPUBLIC IRON POWDER OFFERS YOU NEW PROFIT OPPORTUNITIES IN SMALL PARTS PRODUCTION. Parts can often be made faster, more uniform and at less cost using Republic Iron Powder. It is also being used successfully in making complicated shapes which are difficult to produce economically by other means. Republic metallurgists and engineers, with a thorough knowledge of all types of metals, can help you determine iron powder's suitability to your parts production. Or, they can suggest alternate methods or materials better suited to your particular needs. This service is available without cost or obligation. Just mail the coupon.



REPUBLIC COLD DRAWN SPECIAL SECTIONS REDUCE MACHINING ON WINDOW GEAR TO TWO SIMPLE OPERATIONS. The only machining operations required are cutting-off and drilling. The manufacturer uses Republic Cold Drawn Special Sections preformed to the predominating cross section of the gear. Special sections provide almost limitless flexibility in design. They permit replacement of costly assemblies with one-piece shapes. They simplify built-up, interlocking or associated parts. Higher strength, greater hardness and a bright, smooth finish are additional benefits of the cold drawing process. Republic Special Sections are made to specification in all grades of carbon, alloy and stainless steel.

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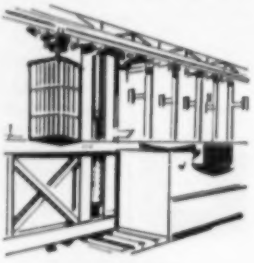
Udylite Fully Automatic machines are now being used to anodize a wide range of products—refrigerator trays, name plates, aircraft parts, automotive grilles, wheel covers, transmission cases—practically everything of aluminum that is anodized on a mass-production basis. And Udylite machines will cut costs on every other treatment of aluminum—dye-anodizing, bright dipping, anodic etching, electropolishing and electroplating of course!



. . . whatever your product whatever your metal finishing problem . . . it pays to consult Udylite.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

LETTERS TO THE EDITORS

Reader's Request Answered

In the Letters to the Editors column of May 14 (page 10), reader William Barrie inquired about the effects of a steel strike on producers or consumers.

I suggest he refer to *The Impact of Strikes* by Chamberlain and Schilling. The authors attempt to ascertain the differing pattern of strike effects in three basic industries—steel, coal and railroads.

With respect to steel, the impact of the three major walkouts of 1946, 1949 and 1952 is rated. Besides general observations, the effects of these strikes on the principal categories of steel users are considered.

While the precise data which Mr. Barrie seeks may not be provided, I do believe the analysis made should establish a sound basis for independent research.

Eugene F. Schlickman
D'rector of Research
National Foundry Association
Chicago

• *Also see the article, "If There's a Steel Strike" (June 18, page 97).*

Consumer Reaction Wanted

Please forward a copy of the report, "New Vistas for Stainless" (Apr. 30, page 92). We have a great interest in these comparatively new developments and the consumer reaction.

A. M. Graham
Stainless Steel Sales Manager
Samuel Fox & Co. Ltd.
Stocksbridge Works
Sheffield, England

Attracted to Honeycomb

I would appreciate three copies of the article, "Honeycomb Panels: On the Threshold of a Boom" (June 11, page 112).

This information is needed to help instruct personnel in the plant on this new and exciting method of fabricating lightweight structures.

W. E. Slade
Project Engineer
Crosley
Division of Avco Mfg. Corp.
Nashville, Tenn.

I am interested in this article. Please send six copies.

Lambert Niedringhaus
Vice President
Niedringhaus Metal Products Co.
St. Louis

As manufacturers of aluminum faced and porcelain enamel curtain wall panels assembled with honeycomb cores (some were furnished for the General Motors Technical Center), we are impressed

(Please turn to page 12)

Undetected Machining Costs Can Lie Right on the Surface

Walking through your plant, it would be hard to see the needless costs hidden in undermachining or overmachining. These unnecessary costs can only be computed after parts are rejected by the inspection department and returned for further work . . . *or accepted with a costlier finish than required!*

Economy in surface finishing depends on machining to exact specifications. Whenever a surface is machined more or less than required, money is wasted. To avoid this requires accurate surface finish measurement *at the machine.*

Up to now, finish has been judged at the machine by looking or feeling.

The new Brush SURFINDICATOR provides a fast, accurate method for determining right at the machine the degree of surface finish produced.

This need not exist any longer, for a portable tool has been devised that makes accurate surface finish checking a simple matter, *anywhere in the plant.*

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The Brush SURFINDICATOR® is an easy-to-carry surface finish measuring device that can be used by any worker wherever needed—for in-process checking of surface smoothness. With this new tool, it is possible to meet optimum specifications without wasting material, time or money.

The operation is simple. A hand-held stylus is stroked over the surface that is to be measured. A direct reading is obtained in microinches, and the worker or inspector immediately knows the exact surface finish already produced. Not limited to one material, the SURFINDICATOR can be used on metals, glass, plastic, paper, wood and other surfaces for maximum finishing economy.

Both the new ASA Standards and the complete Brush SURFINDICATOR description are contained in this booklet. Send for your copy now.

Find out all about this new portable tool that produces savings by preventing finishing waste in your plant. The full story is told in the informative Surfindicator booklet. Also included are the new ASA Standards on surface finish for industrial use. Write for your copy today. 118

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for WHEELABRATOR® STEEL SHOT

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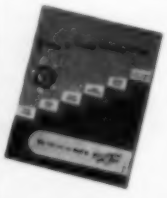
Wheelabrator Steel Shot is now available in the new S. A. E. size S-280

Write now for your copy of Catalog 89-B.



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509 S. Byrkit Street — Mishawaka, Indiana

LETTERS

(Concluded from page 10)

with your article. We could use at least a dozen copies to good advantage.

J. A. Holcomb
Vice President
Wolverine Porcelain Enameling Co.
Detroit

Wanted: Address of ACME

In the Aug. 15, 1955, issue, the article, "Business Consultants: Their Uses and Limitations" (page 123), mentioned the Association of Consulting Management Engineers (ACME). Where can I contact this organization for further information?

William E. Harper
Industrial Consultant
Greater Providence Chamber of Commerce
Providence, R. I.

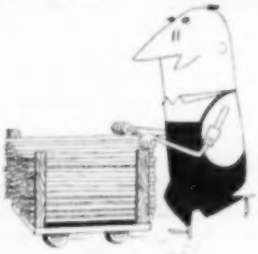
• *Write it at 347 Madison Ave., New York 17, N. Y. The executive secretary is Philip W. Shay.*

Educating Reading

I read your article, "Extra Hands for Engineers" (May 7, page 53) and found it interesting and educating. Kindly send me a copy.

Louis Senis
Mechanical Technician
Electronic Division
Otis Elevator Co.
Brooklyn, N. Y.

Report Interests Tube Seller



Your article, "Tubing Sells Itself to Machinists" (June 4, page 103), is of considerable interest to us as warehouse distributors of this product. We would like 12 reprints.

J. Dana Tomlinson
Manager of Sales
Tubular Sales
Detroit

We read this article with interest and would appreciate receiving ten copies.

Paul W. Davey
Mid-West Forging & Mfg. Co.
Chicago

Tips on Apprentice Programs

I have found your article, "Springboard to Management" (June 11, page 78), interesting. Please send a reprint.

Lloyd R. Jones
Assistant to the Director
of Engineering & Research
Dictaphone Corp.
Bridgeport, Conn.

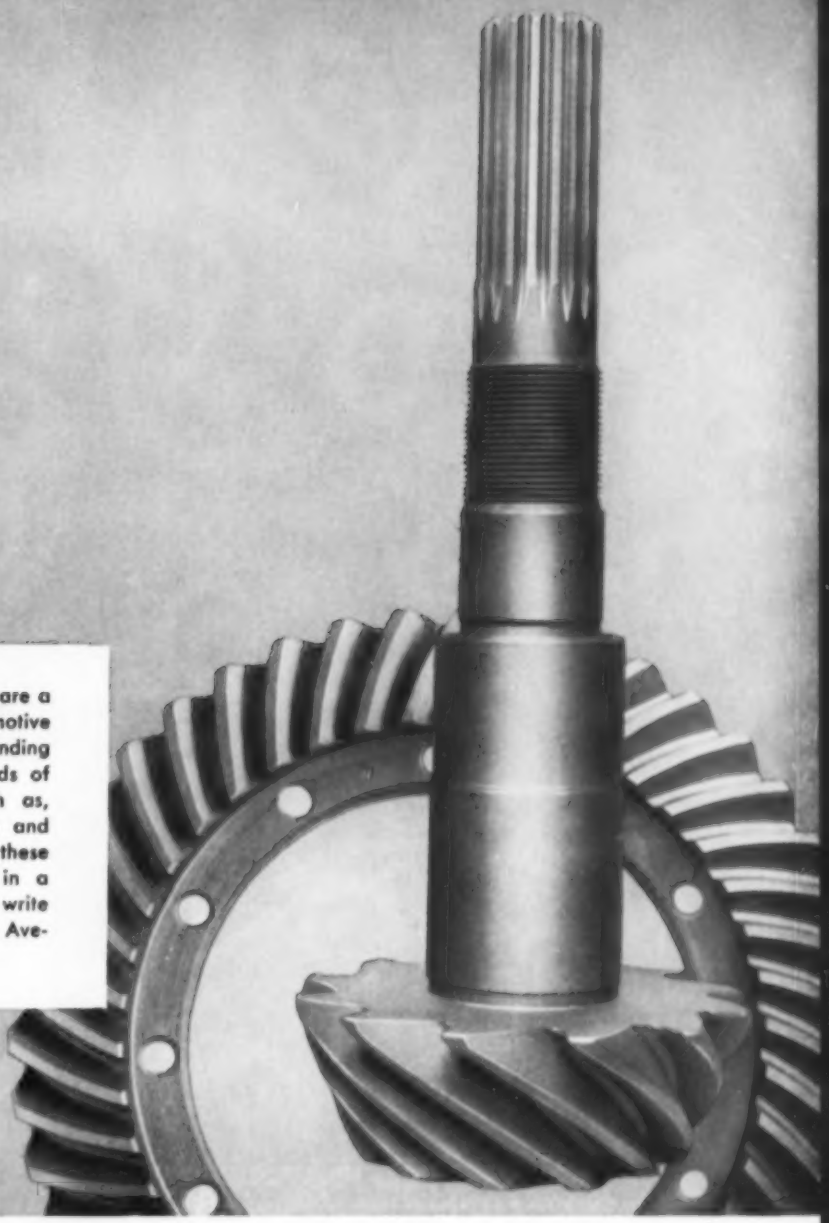
Titanium Data Into Magazine

Please send six copies of the Metal Selector (insert in Oct. 10, 1955, issue). We would also like your permission to reprint the information on titanium in our magazine.

D. A. Van Beelaere
Research & Development
Brooks & Perkins Inc.
Detroit

• *Permission granted.*

"IT'S BETTER IF IT CONTAINS MOLY"



Moly carburizing steels with 0.5% Mo are a natural for components like this automotive ring-gear and pinion. They have outstanding properties that suit them to the demands of gearing and similar applications, such as, superior case hardness, low distortion and good machinability. Many features of these new carburizing steels are discussed in a recent technical article. For a reprint, write Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y., Dept. 3.

Molybdenum Carburizing Steels

MOLYBDENUM OFFERS THE ECONOMICAL KEY TO PERFORMANCE

Over the years, molybdenum carburizing steels have proved their merits in scores of applications and at every level of production.

Design engineers know moly steels for their uniform hardenability, toughness and wear resistance.

Production men know that moly steels are easy to heat treat, easy to machine.

Management knows that moly steels mean economy in fabrication, high performance in a wide range of end products.

Standard molybdenum carburizing steels are widely available. Higher moly analyses may be ordered in heat lots from a number of leading suppliers.

CLIMAX MOLYBDENUM

Use the Moly Key to better carburizing steels

- High case hardness
- Wide choice of hardenability
- Easy to heat treat
- Low distortion
- Good machinability
- Good wear resistance

Here are the largest and smallest springs made from music wire at National Cash Register Co. The small springs are made of wire .006 inch in diameter and are ⅛ inch long. The large spring, about four inches long, is made of 57 coils.

Delicate adjustment during final inspection of accounting machine. Keyboard has Japanese characters.

Where Springs Check Up On Dollars

National Cash Register Uses Johnson's Music Wire to Make Variety of Springs Vital to Efficient Operation of Cash Registers, Adding and Accounting Machines

Algerian merchants in the Casbah and Eskimos in the frozen north, ring up sales on National Cash Registers. In more than 90 countries the whir and jingle of NCR machines keep track of dollars, yen, shillings, and florins—to name just a few.

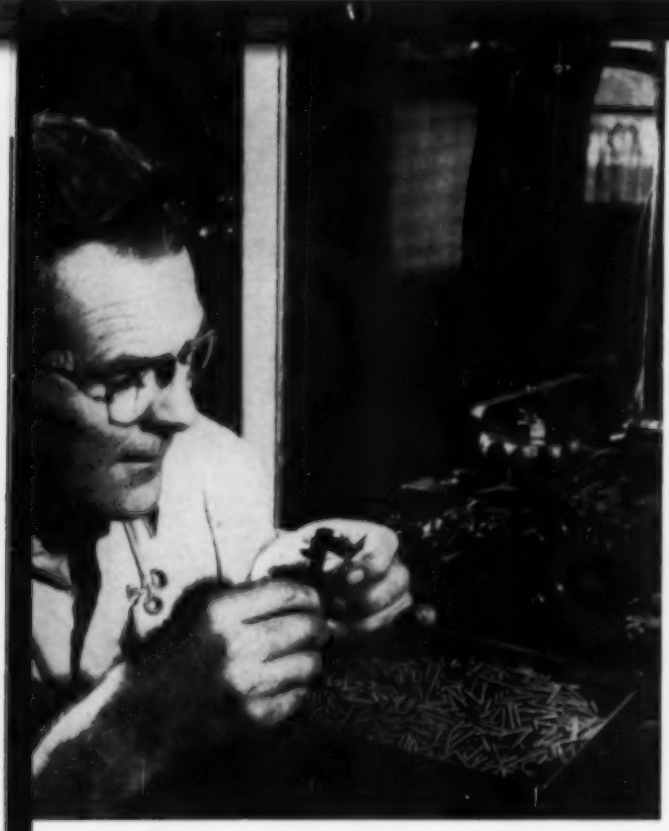
Whether the NCR product is a cash register, an adding machine or an accounting machine, much of its dependability and efficiency depends on springs. These springs are carefully made of high quality music wire supplied NCR by Johnson Steel & Wire Co., a Pittsburgh Steel subsidiary.

More than 2,200 different kinds of standard springs are made in the big Dayton, Ohio, plant of NCR at the rate of one million springs per week. Every one of them is tested before installation.

An intricate machine, like a Class 31 general purpose accounting machine, has more than 500 springs that help perform precise automatic accounting functions. These semi-custom-made machines must have built-in dependability.

Consider the 12 total lever lock line springs used in this machine. These springs, out of sight behind the carriage, are responsible for several different automatic functions. By setting stops in certain positions, an operator can make the machine

(Advertisement)



Coiling lever lock line springs on a No. 0 Sleeper & Hartley coiling machine. Thousands are made in a week.

Magnetic inspection on this intricate electronic device at NCR can check all the wire in a coil.

do different jobs with the selector lever springs raising and lowering plungers. If these springs vary in length or if the wire from which they are made varies in diameter, the tensile strength of the various springs will be different. That means the machine will lose the inter-balance between springs which is necessary for its operation.

Each spring is tested to make sure it will perform correctly. The 1½ inch springs are tested with a two ounce load to make sure every one will elongate to exactly 1⁹⁄₁₆ inches.

In NCR's Indicator Department, where a battery of 17 coiling machines makes thousands of these springs a week, 31½ inches of .011 inch wire is coiled into a 73-coil spring which is .156 inch in outside diameter. Loops on each end are formed out of the final two coils.

Because this pre-tested Johnson wire performs well on coiling machines, production is steady and rejects are low. When the finished springs are installed in accounting machines for a proof test, machine assembly proceeds smoothly without hitches due to defective springs.

To make sure that NCR customers don't lose the use of their machines through the failure of a single spring, the company insures its springs and other parts will give long and accurate job performance. Here's how.

Each coil of wire received from Johnson Steel & Wire is thoroughly tested in the Receiving-Inspection Department by a magnetic inspection device which permits a thorough check of the entire coil—not just samples from each end. Other tests are made in the Materials Laboratory.

Johnson Steel music wire, ranging in size from .005 inch to .016 inch in diameter for NCR uses, meets and exceeds National Cash Register's rigid requirements. As a result, spring rejects on the production line are virtually unknown.

NCR requires music wire that is uniform in diameter, has a fine surface that is free of seams and has the specified tensile strength. Johnson's conformance to NCR standards enables the company to make springs that will remain in balance with each other for long service.

In your plant, too, Johnson Steel wire will give you the same benefits. Johnson's wide range of wire specialties—everything from music wire to clothes line wire—will perform well on your machines and help you build quality into your product. And you can supplement Johnson products with manufacturers' wire produced at the Monessen Works of Pittsburgh Steel. A phone call today to the nearest district office will bring you prompt action.

Johnson Steel & Wire Company, Inc.

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a subsidiary of **Pittsburgh Steel Company**

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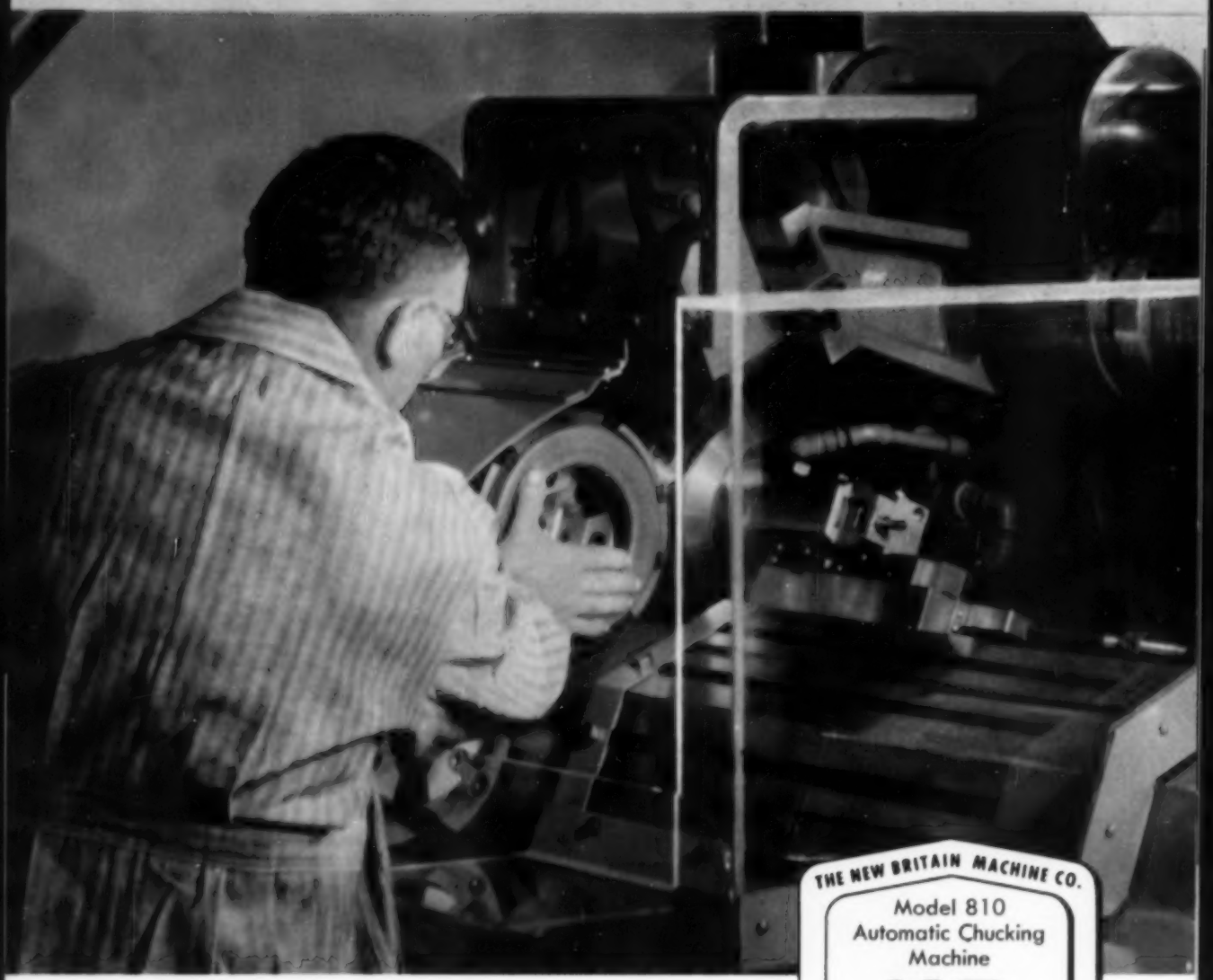

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If you know chucking machines you know the world-wide reputation of New Britains for accessibility, versatility, quick setup and sustained high production of precision parts.

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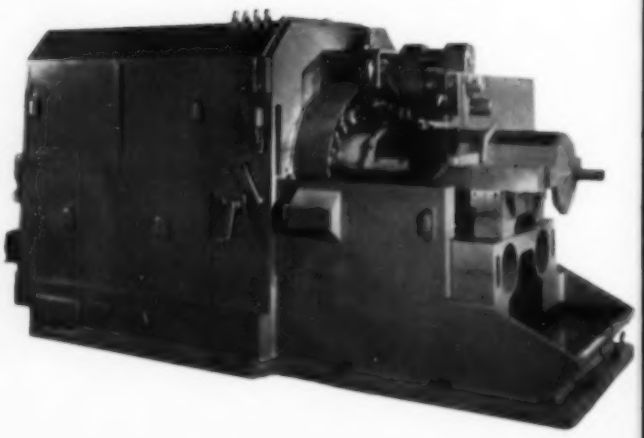
Check this practical approach to more profitable production with your New Britain representative, or write for Bulletin 3R. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



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"Yoloy "E" Plates are used in Norfolk and Western shops for open-top coal car construction. This extra tough, high-strength, low-alloy steel gives added years of useful life to hopper cars."

Because of its superior strength and high resistance to corrosion, abrasion and shock, Yoloy E lasts longer. This means lower maintenance and longer car life, thus contributing to reduced ton-mile cost of rolling stock.

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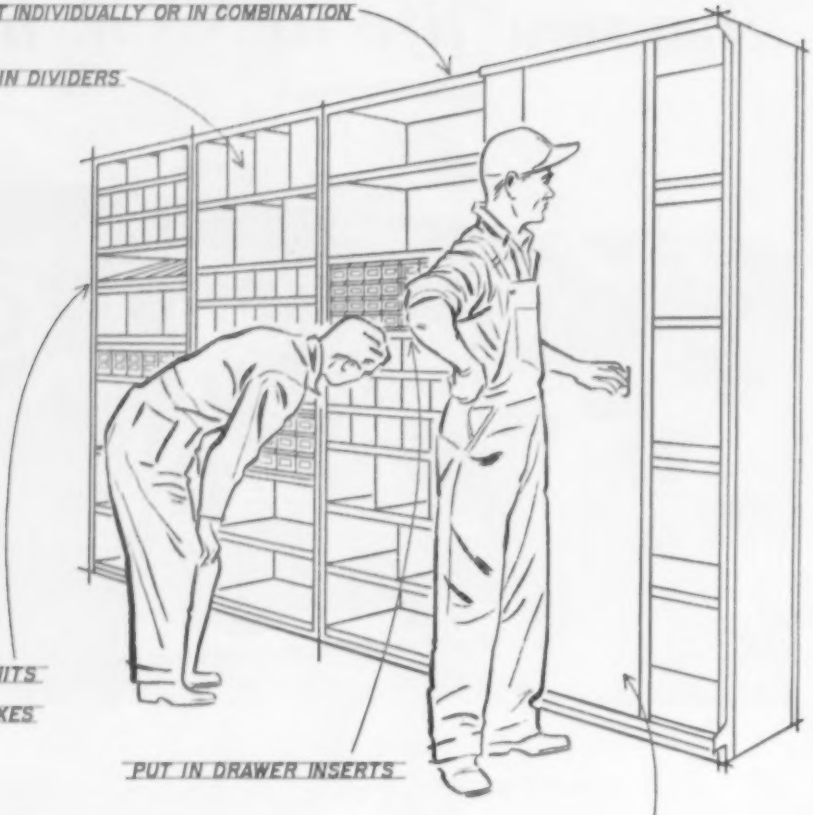

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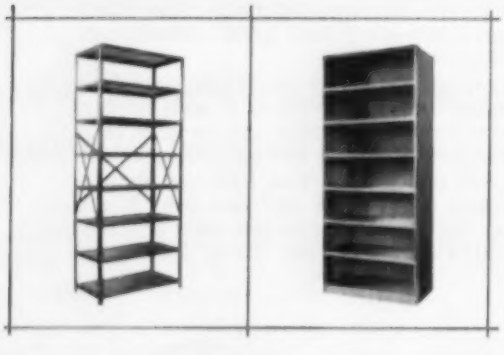

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Forget all about sales pitches and competitive arguments. You make the decision yourself. After comparing the Dimensionair with the air gages now in your plant, or directly in competition with any other air gages, make your decision entirely on the basis of your own actual tests and comparisons. **You** be the judge!

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MORE FURNACE VERSATILITY

Lindberg radiant tube is easy to change. Just turn off furnace, lift old tube out and put in new tube.

These are two of the three Lindberg gas-fired radiant tube carburizing and carbonitriding furnaces recently installed by an internationally known maker of farm machinery. With these furnaces 75% of parts are carbonitrided and 25% carburized. In addition, some bright annealing is done and the versatile Lindberg units can easily be converted for other heat treating applications.

Lindberg Vertical Radiant Tube Great Advance in Heat Treating Furnaces

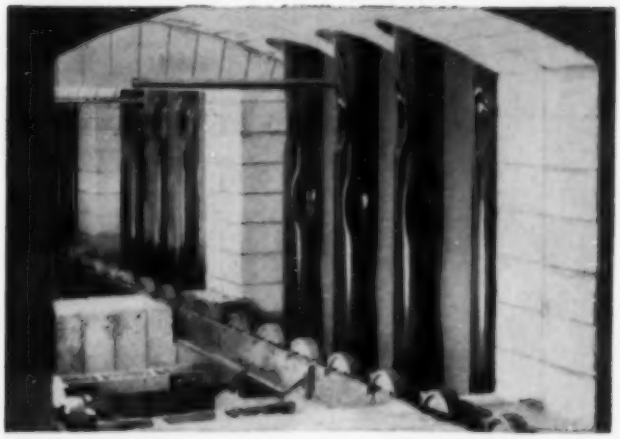
When metal needs heat, Lindberg furnaces with the new Lindberg lightweight vertical radiant tube offer a better way to apply it. Industry the world over is finding that Lindberg furnaces with this new vertical tube provide a versatility no other type of furnace can give. Carbonitriding, carburizing, carbon restoration, bright hardening or annealing and normalizing are all possible with only minor adjustments.

Here are some other exclusive advantages. Lindberg furnaces include a built-in pitless quench tank. Uniform case depth is assured because each charge automatically remains at heat the same length of time. A built-in purge chamber receives work loads for purging prior to heating.

Whatever type of furnace fits your production needs, from gigantic continuous pusher-type to the small manual batch-type furnace, Lindberg engineers can develop exactly the right equipment for you.

This three-row pusher Carburizer, with vertical radiant tubes between each row, was built for a large automobile manufacturer.

WITH LINDBERG RADIANT TUBES



Here you can see the unique "dimpled" design of the new Lindberg vertical radiant tube. Installation is a Lindberg continuous pusher-type gas-fired carbonitriding furnace.

Revolutionary new development

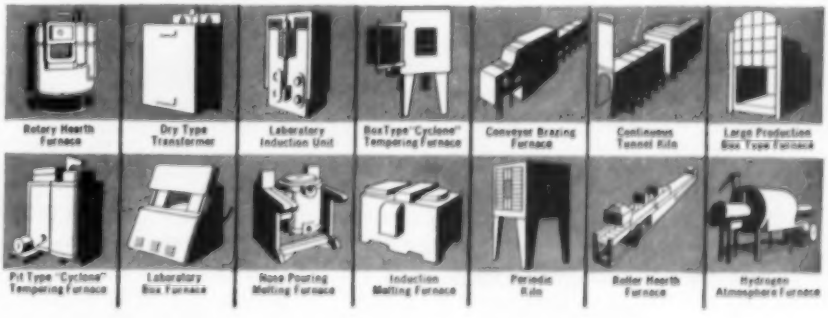
The development by Lindberg of the lightweight, easily-changeable vertical radiant tube (patent pending) is one of the most significant improvements ever made in industrial furnace design. It eliminates the bulk and bend problems of the old-fashioned horizontal tube and the uneven heat patterns inherent in earlier vertical tubes. The secret lies in the new Lindberg tube's "dimples". Here's how they work—in the radiant tube a central stream of mixed air-and-gas is surrounded by a cylindrical stream of air alone and combustion occurs in the area between these two streams. The "dimples" create eddies in the streams accelerating combustion and maintaining even temperatures along the entire length of the tube. If you aren't fully familiar with this revolutionary development ask us, or your nearest Lindberg Field Engineer about it.

This newly-designed Lindberg Hyen generator is used with Lindberg radiant tube furnaces to supply the most exacting atmospheres needed for any heat treatment.

Here is the new Lindberg Carbotrol unit which automatically controls the carbon potential of furnace atmospheres provided by the Lindberg Hyen generator.

For the final step in heat treating, the famous Lindberg cyclone tempering furnace, for 20 years the standard of furnace performance. Pit or box type available.

Lindberg manufactures many kinds of equipment in the industrial heating and related fields. A few of these are symbolized here. If you are interested in any of these please write us for the specifics on them, or get in touch with your nearest Lindberg Field Engineer. (See your classified telephone book.)



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Yoder leads the way

to higher speeds and quality at lower cost

In the short period from 1938 to 1955, the production of electric welded pipe and tubing grew from 269,000 tons to over 3,000,000 tons. This phenomenal rate of growth—over two and one-half times faster than that of the pipe and tube making industry as a whole—to a large extent resulted from a series of important improvements in tube mill design, all introduced by Yoder.

First came the Yoder rotating welding transformer, in 1938. The economic and other benefits conferred by this epoch making innovation were further augmented by other technological advances scored by Yoder in the years that followed. The result was that electric-weld pipe and tube making became the child prodigy of the fast growing pipe and tube making industry.

Latest, and perhaps the greatest, of these developments is the cold forming and induction welding at high speeds of *aluminum, magnesium, brass, nickel, monel, and other non-ferrous metals and alloys.* This process is especially economical for making light and medium gauge tubes in sizes up to 8 in. dia. More and more leading non-ferrous metal producers and fabricators are installing these mills.

More complete information about this and other interesting Yoder developments in pipe and tube mill equipment may be had merely by asking for any of the following publications:

- ☐ Resistance-Weld Mills for making Steel Tubing up to 4" diameter.
- ☐ Induction-Weld Mills for making Non-ferrous Tubing.
- ☐ Resistance-Weld Mills for Steel Pipe up to 24" diameter.

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COLD ROLL FORMING MACHINES

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OF MEETINGS

June 28-July 1, American Coal Sales Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1625 Eye St. N.W., Washington 6, D. C. Executive vice president: W. W. Bayfield.

July 19-20, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

July 25-28, National Tool & Die Manufacturers Association: Summer meeting, Stanley hotel, Estes Park, Colo. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 6-8, Society of Automotive Engineers Inc.: National west coast meeting, Mark Hopkins hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 7-8, National Screw Machine Products Association: National sales conference, Wade Park Manor hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Aug. 21-24, Western Electronic Show and Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and materials exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc.: One Gateway Center, Pittsburgh 22, Pa.

Sept. 12-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

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RIGHT NOW . . . Cannon-Muskegon provides you with a ready source of super-clean, superior strength alloys to meet complex metallurgical applications. Our completely equipped and expertly staffed vacuum melting facilities as well as chemical, physical and metallurgical laboratory can help you *find, test and produce* vacuum melted alloys for any application . . . in test or production quantities . . . with accurately predictable properties.

Ferrous, nickel and cobalt-base alloys are poured at pressures from 1 to 10 microns — resulting in extremely clean metals for smoother surfaces . . . greater tensile strength, ductility and wear life . . . and higher electrical and magnetic properties. Contact Cannon-Muskegon for facts.

Finest laboratory and production equipment is used in our vacuum-melting operation . . . available to you. Let our metallurgical specialists help you solve your alloy problem.

We offer industry

- *Materials for remelt* — under conventional air melting, inert gas, vacuum.
- *Casting development* — includes research and experimental facilities for investment, shell mold, dry sand, and permanent mold castings.
- *Ingots or cast billets* — for rolling, forging or extruding in individual weights up to 250 pounds.

For full particulars write for our New Bulletin on Vacuum-Melting and Air-Melting facilities, products and service.

ULTRA MET
VACUUM-MELTED ALLOYS FOR INDUSTRY

CANNON-MUSKEGON CORPORATION
2893 Lincoln Street Muskegon, Michigan

METALLURGICAL SPECIALISTS

CORE BOX INSERTS OF BERYLLIUM COPPER HELPED THE LEBANON STEEL FOUNDRY BOOST PRODUCTION AN ALMOST UNBELIEVABLE 1400%... COST OF EACH CORE WAS CUT 70%

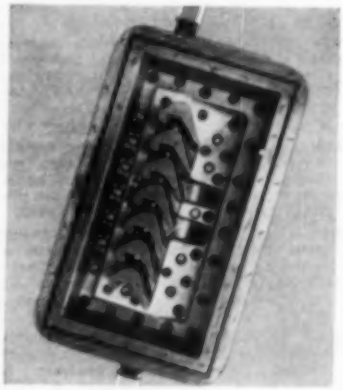
The first core box with beryllium copper inserts, made 4 years ago, has turned out 20,000 cores so far and is still in excellent condition! Reports Lebanon, "We may get 20,000 more cores blown out of that box, maybe 40,000, or even 60,000. There seems to be no end to the amount of wear the beryllium copper inserts will take."

In order to mass produce intricate armored steel louver castings for Army tanks, Lebanon purchased two coreblowing machines. The core box design, however, created very severe wear conditions for the metal inserts used. The space between the blades in the core box was only ¼ in., and to form the sand completely in these narrow spaces, blow holes had to be drilled in the core box between each blade. With a hole diameter of ⅛ in., there was left only $\frac{3}{16}$ in. clearance between the hole and the blade on each side.

The erosive force of the sand blasted through the blow holes under a pressure of 90 psi dished out bellies and chipped the aluminum and chromium plated iron inserts after a production run of only 500 cores. These eroded spots made it impossible to eject the core from the box. Tolerances were completely lost . . . the coremaking machine had to be shut down, the core box dismantled and sent to the pattern shop. Sometimes weeks of valuable production time was lost.

Since 1952, Lebanon has been using "BERYLCO" brand beryllium copper core box inserts—of the original 244 beryllium copper inserts purchased, every single one is still serviceable. Shutdown time due to core box repair, and the wasted labor and time in clerical work, transportation, and reconditioning, have been eliminated.

A technical bulletin describing in greater detail the use of beryllium copper inserts in core boxes, and an all-new castings catalog listing the various "BERYLCO" beryllium copper alloys, their physical properties and casting advantages, will be sent to you upon request. Write today.



Most of the core boxes run about 16 x 8½ x 6½ in. Each blade has .015 in. draft per side. The body of the box is constructed of aluminum with steel facing, and weighs approximately 75 lb. when assembled, including the beryllium copper inserts.

BERYLCO®

THE BERYLLIUM CORPORATION

Tuckerton Road • Dept. 6-F • Reading 19, Pennsylvania

When the foot brake isn't enough

STOP CRANES SAFELY with EC&M

DYNAMIC BRAKING BRIDGE-STOP CONTROL

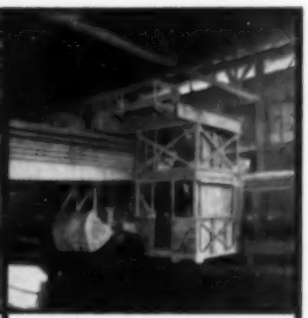
POSITIVE STOPPING by the same motors that drive the crane . . . even when power fails or overload relays trip.

Now . . . collision between cranes, crashing into the end-bumpers, and wheel-sliding stops can be avoided by the use of simple equipment. Crane motors are automatically converted into self-excited generators by this EC&M Bridge-Stop Control to provide quick, positive stopping. Transition to dynamic braking occurs instantly on power failure or when overload relays trip. Braking is not dependent on an outside source of power.

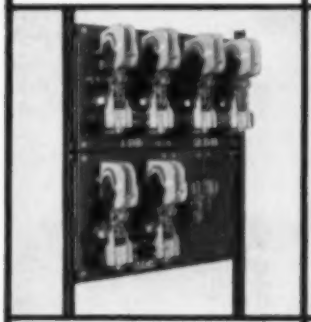
This EC&M system of control is fast and equally effective when traveling in either direction. Graduated braking is maintained throughout the entire stopping period by a pulsating spring-closed contactor . . . an exclusive EC&M feature. On icy, slippery rails, wheels do not slide to a stop . . . instead, this system automatically releases and then re-applies retardation to give a quicker stop than when the wheels remain locked.

EC&M Dynamic Braking Bridge-Stop Control is easily applied to new and old cranes to provide power-failure emergency operation. It is also designed for service-braking operation which is selectively applied by the operator or end-zone limit switches.

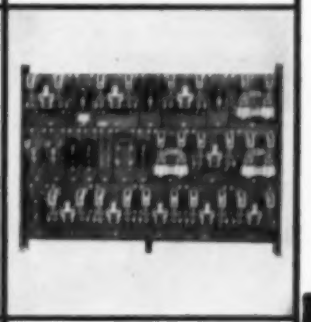
Eliminate hazards due to slippery rails . . . inability of operator to reach foot-brake in time when power fails.



Obtain smoother, safer operation when you change over to EC&M Dynamic Braking Bridge-Stop Control.



For existing installations, this panel provides graduated dynamic braking for quick, sure stops.



Complete Duplex (2-motor) Controller including EC&M Dynamic Braking Bridge-Stop Control.

6149

Write for Bulletin 921-6.0

SQUARE D COMPANY

EC&M DIVISION . CLEVELAND 16, OHIO

Matteson Equipment Company, Inc. now a subsidiary of E. W. Bliss Company

E. W. Bliss Company has acquired controlling interest in The Matteson Equipment Company, Inc., Poland, Ohio.

Matteson has designed and supervised construction of continuous annealing and pickling lines, galvanizing equipment, hot dip tinning equipment and other types of steel mill auxiliary equipment both here and abroad.

Until now, the manufacture of Matteson-designed products was handled by independent sub-contractors. As a subsidiary of E. W. Bliss however, the manufacturing facilities of the entire Bliss organization will be available to Matteson, thus making possible a closer degree of quality control and improved delivery schedules.

Likewise, the addition of Matteson designed equipment will supplement the wide range of rolling mill machinery now built by Bliss.

E. W. Bliss Company
GENERAL OFFICES: CANTON, OHIO

BLISS SINCE 1857 *is more than a name . . . it's a guarantee*

if your product is

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LITHOGRAPHED

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WEIRZIN

electrolytic zinc-coated steel

seals it against rust and corrosion

Decorative color finishes adhere to Weirzin Electrolytic Zinc Coated Steel as though they were part of it.

The secret is in Weirzin's ductile zinc coating, which is bonded to the steel so tightly that it remains intact even under the most severe conditions such as high heat or humidity, deep drawing, stamping or forming. Result: no underfilm rust or corrosion.

Thus paint, enamel, lacquer or ink surfaces cannot be attacked from underneath; hence they cannot crack, chip or flake. No wonder Weirzin products look better, last longer, sell faster!

Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail coupon (right) today.

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin.

My product is _____

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POSITION _____

COMPANY _____

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CITY _____ ZONE ____ STATE _____

A. P. GREEN KX-99

KX-99 firebrick linings in hot metal cars and hot metal mixers provide extra tonnage that means extra savings

The superior toughness and uniformity of KX-99 in hot metal car and hot metal mixer linings has provided such outstanding service records, many leading steel companies have standardized on their use.

The exceptional properties of KX-99 brick enable them to better withstand erosion and slag action. Uniformity of size permits laying up KX-99 with very thin joints to better withstand the scouring and washing action of molten metal.

KX-99 LINING IN HOT METAL CAR.

A. P. Green
REFRACTORY PRODUCTS
SERVING THE WORLD'S INDUSTRIES

For detailed information on service and specific recommendations—contact your local A. P. Green Representative or write

A. P. GREEN FIRE BRICK COMPANY
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PLANTS: Mexico, Mo. • Woodbridge, N. J.
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A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario

Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

Here at Athenia we concentrate on cold rolled high carbon flat steels, custom made of .45 carbon and higher, in widths from .015" to 16" and thicknesses from .001" to .065". Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

For a new and profitable experience in service and in steel controlled precisely to *your* needs . . . try us!

*Trade Mark National-Standard Company

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

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NATIONAL-STANDARD Company
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WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

There's an AIRCOMATIC® welding wire for you!

Aluminum · Stainless · Nickel · Copper · Steel

Successful Aircomatic welding and Heliwelding (where filler metal is required) depend on using the correct wire. Airco can supply the widest variety of wire types and diameters – all specifically designed for use with these inert gas shielded welding processes. All Aircomatic wires meet rigidly controlled specifications as to chemical analysis, surface finish, cleanliness and packaging.

Aircomatic Aluminum Welding Wires. Supplied on 10 lb. expendable spools. New Type A finish for all high-quality work where X-ray standards must be maintained . . . scrupulously clean . . . bright finish . . . properly wound . . . smooth surface assures trouble-free feeding.

Aircomatic Stainless Steel Welding Wires. Supplied on 25 lb. expendable spools . . . excellent corrosion resistance . . . excellent tensile, ductility and impact properties . . . use to weld ordinary joints, apply stainless linings, build-up stainless overlays and join stainless clad materials.

Aircomatic Nickel Base Welding Wires are available in types to weld commercially pure Nickel, Monel and Inconel. These metals can also be overlaid on mild steel or other materials . . . Nickel wires supplied on 25 lb. expendable spools.

Aircomatic Copper and Copper Base Alloy Welding Wires. Use to assemble copper bus bars . . . fabricate copper or bronze vats . . . build-up worn propellers, piston and valve parts . . . supplied on 25 lb. expendable spools in both solid and stranded grades.

Aircomatic Steel Welding Wires. Grades available for welding mild steel, armor plate and for overlays and welding hardenable steels . . . supplied on expendable spools, chip board cores, catchweight coils, or in Wirepaks.

Consult your nearest Airco Representative for technical or metallurgical information.

welding
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AIR REDUCTION SALES COMPANY
A division of Air Reduction Company, Incorporated, New York 17, N. Y.

On the west coast –
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Internationally –
Airco Company International

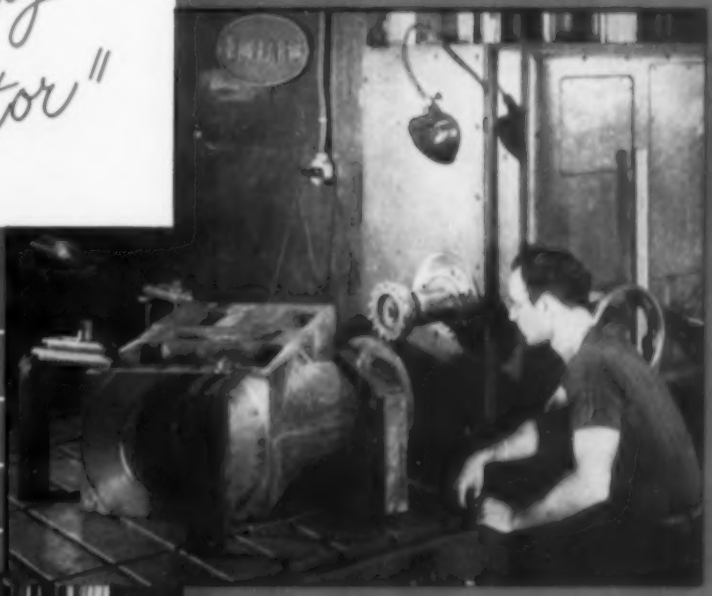
In Cuba –
Cuban Air Products Corporation

In Canada –
Air Reduction Canada Limited

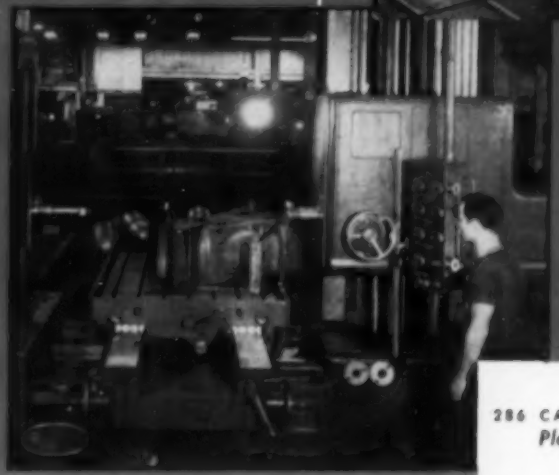
Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO – industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** – carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** – medical gases and hospital equipment • **NATIONAL CARBIDE** – pipeline acetylene and calcium carbide • **COLTON** – polyvinyl acetates, alcohols, and other synthetic resins.

"... the BULLARD pendant control ... is sure handy for the operator"

Says boring mill operator at Fuller Company, Manheim, Pennsylvania, manufacturers of conveying equipment, coolers, compressors and vacuum pumps. Also, he says, "there are no levers to mess around with. On the Bullard H.B.M., Model 75, I can mill on a 45° angle in any quadrant instead of having to jockey in one direction, then in the other — like I had to do on the old machine."



the machine is outstanding for ease of operation



For full information on all the cost saving advantages offered by the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, including screw and rock feed, wide speed ranges, extra rigidity in Bed, Head, Head Post and Rear Post, optical measuring equipment (optional) and Automatic Positioning for head and table (optional),

CALL YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR OR MAIL COUPON TO

THE BULLARD COMPANY
286 CANFIELD AVENUE—BRIDGEPORT 2, CONNECTICUT

Please send me a copy of the NEW H.B.M., MODEL 75 CATALOG ...

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COMPANY _____ POSITION _____

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CITY _____ ZONE ____ STATE _____

When you need them fast,

Cleveland *Top Quality* Cap Screws

reach you by

Extra Fast SERVICE

It's not enough to make Cleveland Cap Screws "Top Quality" if we can't ship them to you, our customer, when you need them.

Your "due date" to us is more than an impersonal figure on your purchase order—we build our reputation on getting cap screws on their way to you in time to meet your needs.

Our job is to make, stock and sell the widest possible range of sizes in Cap Screws, Set Screws and Milled Studs—ferrous and non-ferrous: bright, high carbon and alloy steel heat treated, brass, silicon bronze, stainless steel. We also produce special hot and cold formed parts to your design and specifications. Standard Cap Screws are made in wide size ranges—3/16" to 2½" diameter and in lengths as you require.

For extra fast service we keep stocks-on-hand of every size and kind we catalog, made by the Kaufman *double extrusion* Process that assures you extra strength, extra fastenability. Write for latest Stock List!

Efficient stock "filing system" where millions of screws are ready for quick shipment from Cleveland's soon-to-be-occupied new plant.

The Cleveland Cap Screw Company

2935 East 79th Street • Cleveland 4, Ohio • VUlcan 3-3700 TWX CV-42

Warehouses: Chicago • Philadelphia • New York • Providence • Los Angeles

Four of six Ceco-Drops which replaced Board Hammers in a large automobile forge shop

·CECO-DROP·

The Ceco-Drop was selected because of better maintenance record and ease of operation

High production is maintained—there are no boards to change—fewer adjustments to make

·CECO-DROP·

The Ceco-Drop is safer and easier to operate. "Leg fatigue" is eliminated. There are no overhead hazards

Parts shown here are typical Ceco-Drop forgings

·CECO-DROP·

They are automobile shock absorber parts —pitman, anchor and arms

Have you the latest CECO-DROP bulletin? Write CHAMBERSBURG ENGINEERING COMPANY, Chambersburg, Pa.

To get clean wipers at the tool crib, this lathe operator must make the hike, then stand in line. Dirty wipers in hand, he makes the trip at least once a day, takes several minutes to do it.

He has to waste 60 minutes a week

Easy to distribute

Really soak up oil . . .

Always a clean one handy . . .

Just toss 'em in the trash . . .

With a carton of 125 clean Scott Wipers at every workbench, daily wiper replacement is often unnecessary. One carton can last for days and a man has a fresh supply right at his fingertips.

. . . He stays on the job

The difference is . . . Scott Wipers

Check your production line. See how much time the men are forced to waste in order to keep supplied with fresh wiping material.

It adds up to more lost production time than you might think.

Scott Wipers are disposable. A man picks up a carton when he checks in . . . keeps it with him all day long. He uses one Wiper thoroughly—throws it away. Complicated distribution is ended. So is sorting, baling, and laundering.

And with fresh Scott Wipers there's no danger of hidden chips damaging men or metal.

Your local Scott representative or distributor will demonstrate the Scott Wiper in your plant. Call him or mail this coupon today.

Another quality product of . . .

SCOTT PAPER COMPANY

Scott Paper Company
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Please send me more information about Scott Wipers.

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For Special Operations in Steel Mills...

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Stamco

for the equipment you need

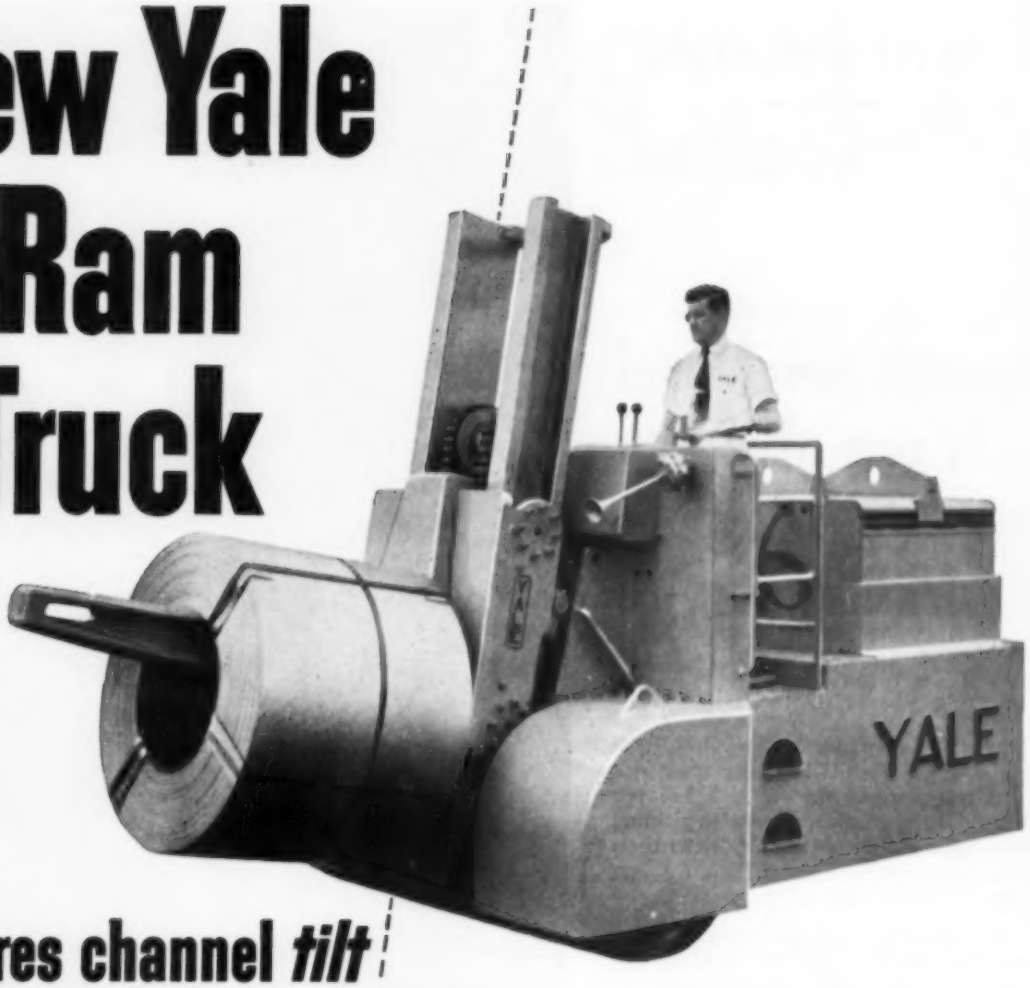
Available in a wide range of sizes and speeds for warehouse and mill duty on ferrous and non-ferrous materials. Tell us your needs and we'll give you complete details.

No obligation.

• LAY YOUR SHEARING PROBLEMS AT STAMCO'S DOOR •

STAMCO, Inc., New Bremen, Ohio

New Yale Ram Truck



Features channel *tilt* plus two brake systems for greater safety

Now, Yale offers you a complete new line of Electric Ram Trucks in capacities from 18,000 to 30,000 lbs. with features designed to provide maximum safety, speed and ease in handling heavy loads. These features include: (1) Channel tilt 3 degrees forward for easy pick-up of coils, 5 degrees backward for secure positioning of the load to prevent load sliding in transport; (2) Two sets of brakes for security—mechanical motor brake for parking and hydraulic service brakes, mounted within the wheels; (3) Hydraulic power steering giving the operator positive control of every truck movement; (4) Dual controls allowing operation from either side of the truck and providing clear visibility for accurate spotting of loads in tight, congested areas.

For further, more detailed facts about the important safety and operating features of this new Yale Ram Truck, write The Yale & Towne Mfg. Co., Philadelphia 15, Pa., Dept. 86.

Additional features of the Yale K48:

- **Elevating carriage** is roller mounted and equipped with side thrust rollers for greater load stability.
- **Motor brake** has "dead man" control, cuts off power and applies brake when operator leaves the truck.
- **Yale exclusive magnetic Cam-O-Tactor** controller provides smooth acceleration.
- **Use of "dead axle"** in the drive unit gives the truck added strength where load concentration is high.
- **Yale K48 Ram Trucks** are available in battery or engine generator powered models with either forks, single or split ram.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

Gas, Electric & LP-Gas Industrial Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

Rework your Monel ...it can give you years more pickling service

Look closely at this pickling crate separator pin.

See those go-nowhere threads and the weld beneath them? They tell a story. For years this piece of Monel* nickel-copper alloy has been used and re-used in pickling equipment. No one at Ingram-Richardson Manufacturing Co., Beaver Falls, Pa., can begin to tell all it has done.

But *this* they do know. Years ago they reworked the original piece. Made it and dozens of other Monel rods into separator pins. For at least 20 years, the metal has been in and out of the pickling bath.

Now look at the pin again. Sure, there are some signs of corrosion. But a nut on those Monel threads would *still* grip. And you can see the rod is sound as a dollar, good for many *more* years' service.

Wrought Monel alloy gives you important weight, safety, strength and design advantages in original equipment. After its original usefulness is dissipated, you can rework it and re-use it. Often several times.

Next time you order batch pickling fixtures, specify Monel nickel-copper alloy. In the meantime, get the newest Inco booklet, "Equipping the Pickle House." Write:

*Registered Trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO NICKEL ALLOYS

Monel . . . for proved pickling life

STEEL
June 25, 1956

Metalworking Outlook

Pessimism in Steel

As of late last week, the pendulum of opinion within the steel industry had swung toward pessimism about chances for a peaceful labor agreement. But steelmen must plan now to shut down in case of strike (see page 51); of course, they're pessimistic. On major issues, the sides are not so far apart as would appear from their press statements. Indications are strong that the union is willing to compromise on the controversial week-end premium pay issue. Similarly, steel companies may agree to modify their SUB proposal.

Steel Stocks: Large, but Unbalanced

Steel users probably have 18 million to 20 million tons of finished products in inventory, but the stocks are unbalanced—for example, plenty of cold-rolled strip, little plate or structural tonnage. If there's a strike, a few plants would have to curtail operations in about two weeks. After that, there would be a steady shutdown of facilities until after the strike ended. If a walkout lasted more than a month, many plants would have to slow down for lack of specific steel products, even though they may have substantial quantities of the metal.

The Alabama Strike

Tennessee Coal & Iron Division of U.S. Steel Corp. has offered 12,000 idle steelworkers $2.1 million in advance vacation pay as financial relief from the layoff that started Apr. 28. The move is unusual because the steelworkers aren't striking; they're refusing to cross picket lines of 264 railroad workers on strike at the Birmingham district. TCI employees have lost $17.5 million in wages in the two-month fracas. Steel ingot losses exceed 550,000 tons.

Scrap Survey Coming

Watch for a governmental survey of the scrap situation. Congress will sanction the funds. Delaying it last week was House-Senate disagreement over who should make it. The House favors the Commerce department; the Senate, the Bureau of Mines. Provision for the survey will be part of the Export Control Act, now up for extension. It will contain nothing significantly new on scrap export controls.

Britain Needs Engineers, Too

The shortage of engineers is three times as bad in Great Britain as here, claims Dr. D. F. Galloway, director of Production Engineering Research Associates, a British research organization. Last year, England graduated 3000 engineers, one-tenth as many as the U.S. did, although the United Kingdom's population is about one-third that of this country's. Another observation by Dr. Galloway: The Renault auto plant in Paris has the

most advanced automation in the world. Its motor blocks are completely machined with only two men at the controls, both unskilled.

Freight Cars Roll

Freight car builders are beginning to roll. Their deliveries hit 6667 in May, highest in any month since October, 1953. As of June 1, backlogs were 133,072, down 4000 from May 1 figures but still far above the 16,886 on order June 1, 1955.

Memo on Studebaker-Packard

A deal is still pending whereby Curtiss-Wright Corp. will participate in Studebaker-Packard Corp. management and refinancing. A merger is not in the cards immediately, but Curtiss-Wright may get a kind of management contract. Also in the works: More defense contracts for S-P, an arrangement with Mercedes-Benz to let S-P dealers take on the German luxury and sports car line.

Merger Matters

The Federal Trade Commission's report that mergers in 1955 hit a 25-year peak touches off new demands for speedy passage of antimerger legislation. Some may slip through, rushed by the lawmakers in the last days of the legislative merry-go-round. In manufacturing and mining, 689 mergers occurred last year, 112 of them in nonelectrical machinery.

Prices on Industrial Property Rise

Demand for one-story industrial buildings is rising, boosting prices moderately, particularly for facilities to be used in manufacturing. Other findings by the Society of Industrial Realtors: Land appropriate for industry is increasingly scarce and more expensive; industrial park sites cost more than they did a year ago; older and multistory buildings are harder to sell; financing on industrial facilities costs more than it did a year ago.

Straws in the Wind

Rumors have it that one auto company will use a magnesium rather than an aluminum transmission housing in 1957; its engineers say aluminum doesn't machine fast enough to be economical . . . In the week ended June 9, the auto industry's rising layoff trend reversed itself—21,000 people were called back, compared with 7000 fresh layoffs . . . William H. Lowe, Inland Steel Co.'s treasurer, predicts steel consumption of 220 million tons by 1975, based on a population increase to 221 million and a per capita consumption gain to 2000 lb by that date . . . Re-evaluation of the dormant elephant tool program may be in store . . . Domestic producers and importers of fluorspar will trek to Washington for a June 27 hearing by the Office of Defense Mobilization to determine if imports threaten to impair national security . . . General Services Administration begins procurement of $50 million worth of machine tools for the turbine and turbine gear mobilization program.

For cost-cutting control of strong corrodents

1 call gets you ALL forms of...

For super corrosion resistance to sulphuric acid and a long list of other strong corrodents, even at high heats and concentrations, one call for Carpenter Stainless No. 20 and No. 20Cb can save you time, money and worries. Call your nearest Carpenter Distributor or Sales Office. No matter what form of Carpenter No. 20 or No. 20Cb you need... how large or small your order... you can count on getting service satisfaction plus any engineering and fabricating assistance you may want. If you'd like to compare Carpenter No. 20 and No. 20Cb with other materials under identical conditions, test samples will be supplied without cost to you.

MEMBER

The Carpenter Steel Company,
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

Electronic "Detective" guards your profits when you use Armco Stainless Bars

This "detective" is the latest in electronically operated magnetic inspection units. It makes sure your Armco Stainless Steel Bars are free of surface cracks, seams and slivers . . . keeps your rejects down and profits up.

EVERY INCH TESTED

Armco Stainless Steel bars inspected on these units get a thorough "going over." Every square inch of these bars is tested. Whenever a defect is found the oscilloscope "blips" and a speaker squawks. Defective bars don't go into your order.

This is just one of the many special tests that are routine at Armco. From melting to shipping, a quarter-century of stainless experience backed up by the most modern testing insures uniformly high quality in Armco Stainless and lower production costs for you.

A GRADE FOR LOWEST COSTS

You can choose from more than 30 standard and special grades of Armco Stainless bars and wire. You'll find one to meet your specific service and fabricating requirements *at least cost*. All grades are available in a wide range of sizes, shapes and conditions.

For complete information on profit-guarding Armco Stainless Steel bars and wire, just fill out and mail coupon.

ARMCO STEEL CORPORATION
1786 Curtis St., Middletown, Ohio
Please send me data on Armco Stainless Steel bars and wire.
We manufacture_____
Name_____
Company_____
Street_____
City_____ Zone____ State_____

ARMCO STEEL CORPORATION

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The Bumblebee Still Flies

When we started to tabulate the returns from our survey on what metalworking managers expect for the second half (page 47), we fully expected to find some of the pessimism economists hold for the third quarter. We didn't. Perhaps we have been listening to the wrong economists.

While some of the 1250 participants in the study believe midsummer operations will dip below the first half level, they are confident that any losses in July and August will be made up in the last four months. Dollarwise, they say, the second half will be better than the first six months, that this year will be substantially better than last year.

Part of the predicted dollar volume will result from second half price increases. But physical volume also will increase modestly. Employment will rise. Manufacturing capacity will continue to be expanded. Profits will hold despite boosts in wage and material costs.

We have a lot of respect for what our respondents believe is ahead for metalworking. On occasion, they have contradicted the predictions of the professional economists. Immediately following World War II, for example, governmental and private economists thought we would slide into a deep recession, that unemployment would assume vast proportions, that our adjustment from war to peace would be attended by economic suffering. Their prophecies were widely accepted.

Participants in STEEL's survey that year said there would be no depression. They said production and employment would rise sharply. They were right. The prophets of doom were confounded.

In all our surveys over the last 11 years, the respondents never have been wrong on direction. That, of course, does not preclude the possibility that they will be. This could be the time.

But, as Dr. Edwin R. Nourse once said, the psychology of the people is much more important in determining what happens in business than are all the statistics and charts of the economists. If enough people believe business conditions will be good, that in itself is a potent factor for good business.

We are reminded of the old gag about the bumblebee which aerodynamic engineers proved could not fly. The bumblebee, unable to read the engineers' equations, didn't know that flight was impossible for him and went ahead and flew.

And the bumblebee is still flying.

Walter J. Campbell

EDITOR

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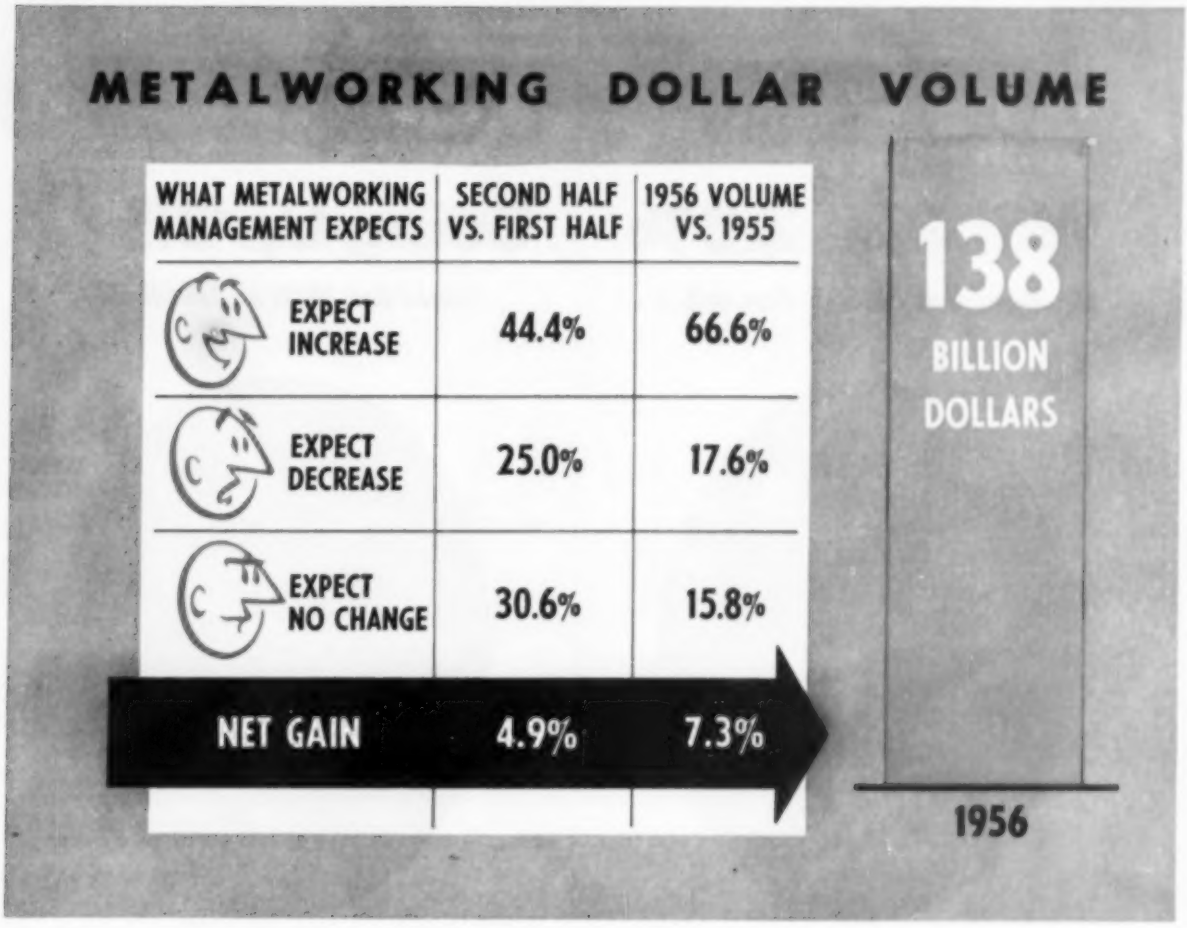


WHAT METALWORKING MANAGEMENT EXPECTS

Another Record Year in Sight

Three of four expect second half dollar volume will equal or exceed that of first six months. Costs and prices to rise. Capital goods and construction lead way to new plateau

DESPITE concern over a midyear dip in business, metalworking executives believe the second half will mark a new record in dollar sales.

They also expect a new record for the year. Total metalworking sales are forecast at $138 billion, up 7.3 per cent from a revised figure of $129 billion for 1955.

That is the consensus of metalworking managers participating in STEEL's semiannual survey on what's ahead in business. The editors questioned managers of 5000 plants, received replies from more than 1250.

They expect dollar sales volume in the next six months will be 4.9 per cent higher than in the first half. Three of four say second half dollar volume will be as good or better than that of the first half —itself a boom period for most metalworking companies.

A large part, but not all, of the

METALWORKING SALES
(Billions)

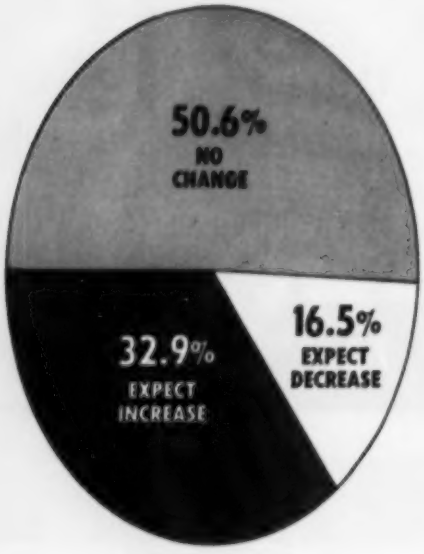
1956	$138*
1955	129†
1954	107
1953	121
1952	105
1951	99
1950	83
1949	67
1948	71
1947	61

*Estimated †Revised

EMPLOYMENT

Will Rise 2.8%

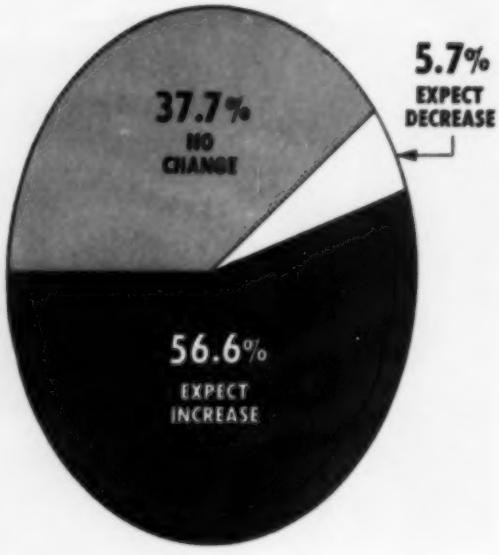
Second Half 1956 vs. First Half



SELLING PRICES

Going Up 3.5%

Second Half 1956 vs. First Half



Skilled Worker Shortage Is Expected by 22%

improvement will result from second half price increases. The inflationary bias evident in the economy for two decades is expected to continue. Over-all price increases in the second half are estimated at 3.5 per cent.

Picnic Weather—Although a few clouds are seen for the early part of the third quarter, most metalworking managers believe the downtrend will be little more than should be expected seasonally. July and August output will be slower than the first half average because of vacations, warm weather and other factors. The last four months of the year are expected to be strong.

All predictions are predicated on general labor peace. A long steel strike could knock the optimism into a cocked hat.

Mixed Blessings — Other predictions by metalworking managers:

Employment will be up. A gain of 2.8 per cent over the first half is foreseen.

Skilled workers will continue scarce. Nearly one of four managers expects the shortage will restrict production.

Expansion will continue. Twenty-seven per cent of the plants covered will begin expansion of capacity during the next six months. This will include new plant, additions to present plant and, most importantly, installation of new, more efficient machinery and equipment.

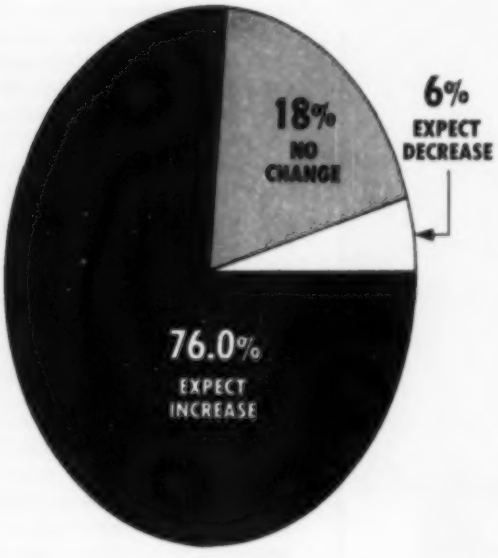
Profits will be a little better. Consensus is that they will be 2 per cent above earnings for the second half of 1955.

Materials will continue scarce for some companies. The pinch will be felt most in steel products,

MANUFACTURING COSTS

Will Jump 5%

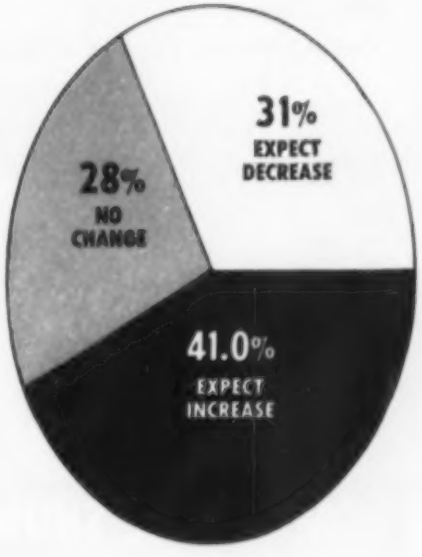
Second Half 1956 vs. First Half



PROFITS

2% Higher

Second Half 1956 vs. Second Half 1955



copper, nickel. Some steel products, notably the light flat-rolled items, will be in much easier supply.

Manufacturing costs will continue to rise. Wage increases and resulting higher material costs are expected to outrun increases in manufacturing efficiency.

Rain for Some — Not all metalworking managers share the optimism generally evident in the responses. A substantial number believe the third quarter dip will be severe. They doubt that fourth quarter recovery will be strong enough to permit the establishment of new records in the second half. They reason that first half operations have been so close to capacity that there is no room to make up any losses occurring in the summer.

Among those are the basic steel producers. Production of 63 million tons during the first six months was so close to practical capacity that any dip in July-August will make the equaling of first half output an impossibility.

Consumers Sheltered — Steel inventories held by consumers are estimated at 18 to 20 million tons. That will permit metalworking companies to operate at a relatively higher level than the basic steel producers.

Automobiles remain a big question mark in the minds of many metalworking executives. Generally, nothing spectacular is expected from the auto industry in the third quarter, but a strong comeback is foreseen in the fourth quarter.

Actually, metalworking sales and production figures in the first six months indicate the auto industry's performance is not so dominating an influence as John Q. Public supposes. While motordom's showing during the first half was disappointing, it did not drag the economy down. Strength in construction, machinery and other capital goods lines more than offset the weakness in automobiles.

Sunshine—Brightest factors in the metalworking picture for the next six months and into 1957 are the surges continuing in most types of machinery and in construction. Capital goods manufacturers generally are booked solid well into next year, and no important cancellations or deferments are apparent.

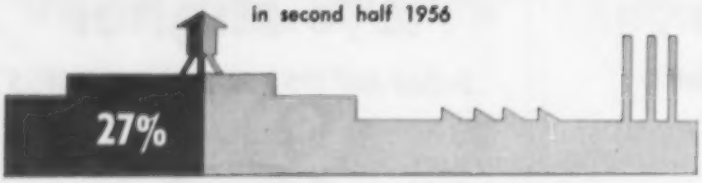
Construction, likewise, is pushing up the industry all along the line. The summer will be especial-

WHAT METALWORKING MANAGEMENT EXPECTS

CAPACITY

Will Go Up 3%

in second half 1956



of All Plants Plan to Expand Facilities

17%	37%	68%
Will Build New Plants	Will Build Additions	Will Buy New Equipment

MATERIAL SHORTAGES

Will Continue To Restrict Production

16% Expect Shortage of Steel Products

8% Expect Shortage of Copper

6% Expect Shortage of Nickel

2% Expect Shortage of Stainless Steels

2% Expect Shortage of Aluminum

2% Expect Shortage of Brass

4% Expect Shortage of Other Metals

ly active because many projects have been delayed by weather conditions, strikes and shortages of materials. The summer months will be a period for catching up.

Survey respondents also see continuing strength in containers, railway freight cars, aircraft, the newer types of household appliances, office equipment and machinery and all kinds of computers. Computers are getting a strong uplift from defense programs for missiles and new type aircraft.

Dark Clouds — While over-all survey results show a strong optimism among metalworking managers, both for the next six months and for the longer pull, respondents comment vigorously on some of the problems facing them. Four are mentioned repeatedly.

Some small companies complain bitterly that they are forced to pay premium or gray market prices for steel. A few call for an investigation. They contend that during the first half they were unable to get sufficient steel through regular sources and were forced to patronize gray marketeers.

Tight money and credit policies are bothering some small, rapidly expanding companies.

Taxes continue to be unpopular. Federal levies have been a standard gripe in every postwar survey. The current questionnaire reveals nothing new.

The Squeeze—Biggest complaint of all is from the small and medium-sized companies caught in squeeze between increasing costs and competitive pricing. With wage and material costs destined to go up again this summer, many metalworking managers doubt that they can pass the increased costs along to their customers.

The answer, as indicated by scores of respondents, will be to try to increase manufacturing efficiency still further through the use of improved methods and more automatic equipment and machinery. Nearly nine of ten respondents complaining about the cost-price squeeze are confident they can hold their profit lines.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Strike Insurance

Big steelmakers need four-five days to shut down their operations in a safe, orderly way

THE IRONY of it all: Steelmakers will start banking their furnaces this Wednesday, even though they hope for a settlement of negotiations with the United Steelworkers of America before midnight, June 30 (or an extension of the talks).

You can't wait until the last minute to shut down such valuable facilities as blast furnaces, open hearths, coke ovens and other equipment. (The union may agree to allow workers in the plants after the deadline to complete an orderly shut down, but there's no word, yet.)

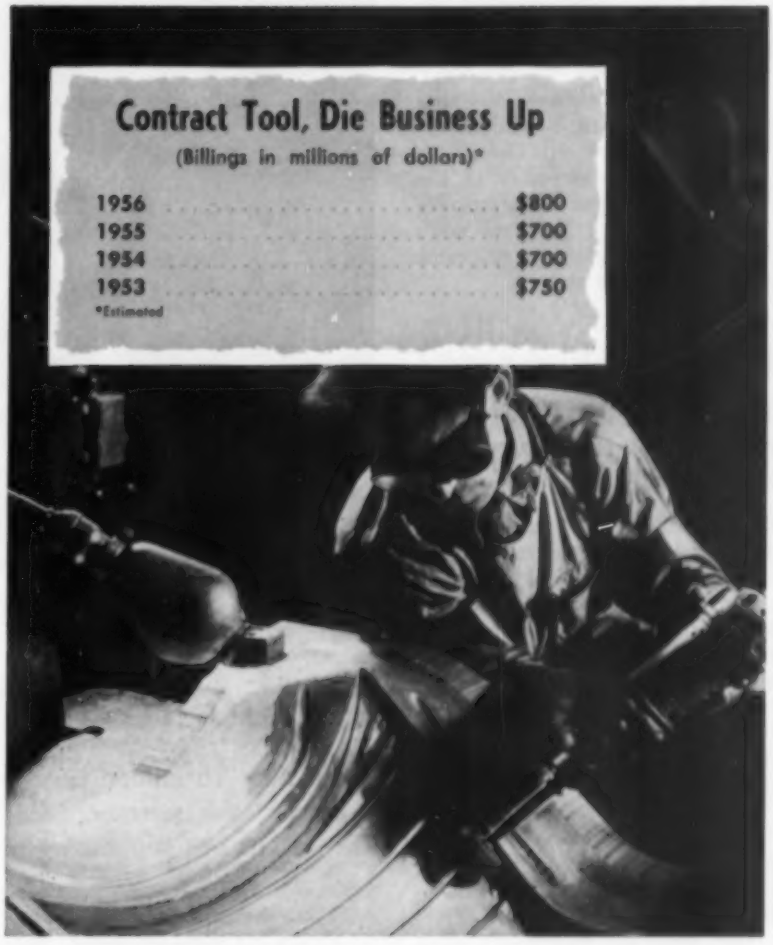
Look Ahead—It takes from 24 to 48 hours to close down a blast furnace or open hearth. But you can't stop all your furnaces at one time. Works with more than one furnace will taper off operations, charging the last furnace on June 29. The last heat will then be tapped at noon, June 30, allowing another 12 hours to complete the shutdown.

Exceptions to the stoppage include firms with no agreements with the union. Some of these are: Weirton Steel Co. of National Steel Corp.; some of Armco Steel Corp.'s plants; Keystone Steel & Wire Co.; International Harvester Co.'s Wisconsin Steel Co.; and Ford Motor Co.

Temperamental—Like the ladies they used to be named for, blast furnaces are a temperamental lot and the key to recovery operations. After a shutdown of considerable length, it takes one to two weeks to work out all the kinks. The first cast can be made 12 hours after the crew returns.

Open hearths, after a stoppage of more than 24 hours, also need attention before capacity operations come back. Older furnaces may need repairs taking two to three weeks. New furnaces will be running again in about 60 hours.

Crux—If a shutdown is a matter of hours only, you can expect the nation's steel operations to be at capacity within three days. If a strike lasts longer, then it could take up to a maximum of 30 days.



High tool, die volume augurs well for all metalworking, now...

Tooling Toward a Record

SOME TOOL and die men are already getting inquiries from auto companies about tooling for '58 models.

That's how busy contract shops are as they look forward to an estimated $800-million year, $50 million higher than in 1953, the best 12 months to date (see table). Nine months ago, industry men thought they would be fortunate to do $725 million in sales this year (see STEEL, Oct. 17, 1955, p. 77).

Widespread — Detroit establishments are particularly optimistic, but that feeling is general. Demand from the auto companies and part suppliers is the big mainstay, even outside Michigan. "It's so strong," comments one company, "that we have had to turn down a lot of Detroit business. Some of the more minor changes originally planned for 1957 cars just aren't going to be made because the tooling is unavailable."

Besides the good business expected from the top customer, autos, the industry is looking for promising volume soon from guided missiles. Most of the work has been of a prototype nature. Sales from the electronics industry have been growing. A big aircraft tooling program will probably be let in the next two or three months.

Long Hours — Tool and die makers in contract shops are working an average of about 50

hours a week. That indicates the chronic shortage of skilled help, the industry's most serious problem.

"At last we have enough young men interested in becoming apprentices," points out George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association, "but now we don't have enough apprentice programs in which to place them."

Parts Big Business

The auto industry's stake in replacement parts and accessories sales doubled in 15 years

BUICK DIVISION, General Motors Corp., sold two rear fenders for its 1938 Special last year. Its main parts and accessories warehouse, Flint, Mich., has four more.

"We believe the four on hand will satisfy the demand for all time," says Paul E. McCracken, Parts & Accessories Division manager, who directs the stocking of 30,000 other Buick parts.

Growth—Auto company part inventories have increased about 400 per cent in the last ten years: From 3.5 million to 15 million parts.

But, notes Mr. McCracken, most of the parts are inactive, like the 1938 fenders. The 22,000 stocked at Flint account for less than 1 per cent of Buick's part business.

About 95 per cent comes from 2700 different parts handled by Buick dealers.

Sales Volume—Since 1941, Mr. McCracken reports, the auto industry's sales volume of replacement parts and accessories has gone from $700 million to $1.7 billion annually.

Buick Cuts Shipping Time

Shipment time for parts to western and southwestern assembly plants has been cut by two days, says Buick Division, General Motors Corp. Co-operating with the Chesapeake & Ohio Railway, Buick eliminated classification of freight cars at Plymouth and Grand Rapids, Mich. Trains are made up at Flint, Mich., for direct movement to Chicago.

Evinrude power takes work out of trout fishing in Wyoming

Outboard Motors Get Nod

More than 16 million people are enjoying "messing about in boats" this summer. Most of them are outboard fans. The results are big business.

ASK the average American why he bought his outboard motor, and he'll answer, "to take the work out of fishing."

Some $151 million went for outboards last year. More than 65 per cent of the buyers were tired but ardent fishermen. Reports from the Outboard Boating Club of America, Chicago, show that cruising, hunting, water skiing and racing were the next most popular reasons.

Popular Number—It's estimated that more than 5 million pleasure craft are in use. Outboards are by far the most popular—some 4.2 million are in the water. Total spending in the industry runs into big money. It's estimated that boat lovers this year will put out as much as $1.2 billion for new and used equipment, accessories, insurance, etc. That's double the $650 million spent only five years ago.

A steady trend: The move toward bigger outboard motors. OBC's report shows that last year was the first in which the 12 hp (and larger) outsold the others. In 1947, motors under 7 hp accounted for 87 per cent of unit sales. Last year, they only got 31 per cent. Meanwhile, the big motors jumped from 2 to 37 per cent of sales.

Trends—Behind this emphasis: Growing popularity of outboard cruisers, desire for speed and the increasing interest in water skiing. So the 25 builders of outboards are staging a horsepower race. Evinrude and Johnson are abandoning their 25 hp engine in favor of a 30 hp model. Mercury builds a 30 and a 40. Montgomery Ward & Co. has joined in with a 25 hp unit and Scott-Atwater has upped its largest power plant to 33 hp.

No one in the power boat industry expects anything but good business. You can get a good combination, boat and motor, for under $1000. More cars on the highways will mean that more families will see the advantages of the comparative freedom of the water.

Brass Weds Aluminum, Again

How do you diversify? Bridgeport Brass's acquisition of Hunter Douglas illustrates one method: Buy another firm to gain its patents, contracts and experience

BRIDGEPORT Brass Co., like other metalworking firms, doesn't allow its name to confine its operations. As early as 1937, it branched out into aluminum.

Now Bridgeport has acquired Hunter Douglas Corp., Riverside, Calif. The move is an example of how a company can add weight to its stature and put more potential into its future through planned diversification.

Added Depth—The deal shapes up this way:

Among its diverse operations, Hunter Douglas has an established line of aluminum venetian blinds and awnings. It furnishes franchised manufacturing distributors with components and equipment to assemble the products. HD will continue to expand this facet of its business.

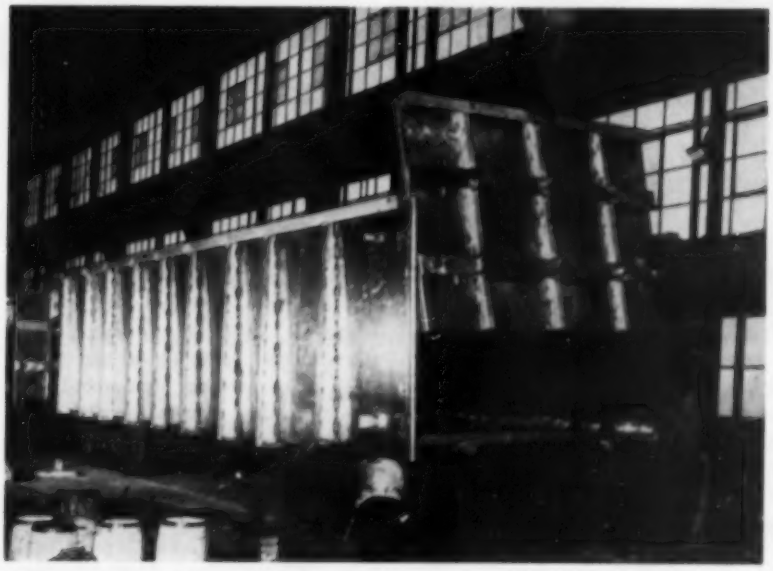
Through Hunter Douglas, Bridgeport will strengthen its position as a producer of aluminum shapes. HD holds patents on continuous casting and rolling processes which make it possible to convert aluminum ingots into hot-rolled strip in a matter of minutes. Sheet and strip account for about 55 per cent of all aluminum mill sales. Equipment is being designed for Hunter Douglas which will give it a complete line for this market (widths will go to a maximum 24 in.).

Bridgeport has been in this field since 1937, when it contracted with a primary aluminum producer to sell sheet and circles through its brass mill sales staff. In 1954 it leased the Air Force's Adrian, Mich., aluminum facility. While the AF has first call on the extrusions, tubing, rods and forgings (up to 2600 lb) produced, Bridgeport sells a large share of its output to industry.

Future—HD's research programs in rockets and guided missiles (cold and impact extrusions) will lead to new defense contracts.

This gives Bridgeport an ace in the hole. As some brass mill items become less important to the military, the development of aluminum for defense will enable the company to continue as an important military supplier.

Outlook — Says Herman W. Steinkraus, chairman and president of Bridgeport: "We are not limited to the use of any one or two basic metals. We can use copper, zinc and aluminum while developing the future possibilities of magnesium, uranium, zirconium and titanium."



Magor Car Corp. Makes Aluminum Gondola Car

Extruded shapes are used in building a car for Kaiser Aluminum & Chemical Corp. The end section being lowered will be sealed with hot driven rivets and welded at the corners. Kaiser's alloy 5086 provides strength and weldability

Architects Approve

PEI says architectural porcelain enamel volume is rising with acceptance of metal curtain walls

THE DOLLAR volume of architectural porcelain enamel is expected to pass $60 million this year. That compares with $47 million in 1955; $36 million in 1954; $27 million in 1953.

Curtain Walls—The growth of the industry is due partly to the use of metal curtain wall construction by architects and builders, says James W. Vicary, chairman, Architectural Division, Porcelain Enamel Institute. He cited these advantages of curtain walls: Economy in space and weight; ease and speed of erection; prefabrication and factory assembly; appearance and versatility.

"To these advantages," says Mr. Vicary, "the porcelain enamel industry has added color."

And Veneer—Veneer type construction has contributed to the industry's growth. Applications include exterior walls and trim, special details and interior uses.

John C. Oliver, managing director, PEI, reports curtain wall specifications have been approved and will be published as tentative standards this fall.

Injury Rates Rise

The average injury-frequency rate in manufacturing during the first quarter was 2 per cent higher than that of the preceding period. At 11.9 injuries per million employee-hours worked, the rate was 3 per cent above that of the same quarter last year.

Accidents followed seasonal trend. The rate was 12 in January and February, while the March rate hit a record low of 11.6.

Second Half Looks Good

U. S. Chamber of Commerce reaffirms that 1956 will be our best year. Soft spots have been getting too big a play, say business spokesmen

OPTIMISM keynotes the latest reports on the business outlook from Washington. Consensus of spokesmen at the U. S. Chamber of Commerce's midyear review and forecast meeting closely parallels that of metalworking executives polled by STEEL (see page 47).

Some of industry's representatives at the Washington meeting pointed out that difficulties have been exaggerated.

Home Truths—Paul M. Mulliken, executive director, Retail Farm Equipment Association, reported that through mid-May, farm equipment sales were off only 13 per cent from those of 1955, and running at about 1954's level. One-third of the dealers, he said, report that their sales are better than last year's.

Even a spokesman for the auto dealers admitted that the industry would have at least its third best year—selling about 5.8 million cars—though dealer profits will drop.

The Leaders—Established 1956 front-runners like construction, housing, and structural steel are expecting to hold their performances through the rest of the year.

William J. Cheney, executive vice president, National Foundation for Consumer Credit Inc., had another answer for professional gloom mongers: "About 56 per cent of U. S. families have no installment debt. There is nothing in the consumer credit picture which should be considered as a stumbling block to continued expansion."

Highway Bill Gets Set

Watch for congressional action on the highway bill this week. Senate-House conferees have ironed out most of the differences between Senate and House versions.

Outlook is that the $25 billion to be authorized for the 40,000 mile interstate system will be apportioned to the states on the Senate population-area-mileage formula for the first three years. For the remaining ten years of the 13-year program, it will be awarded on the basis of need.

Civil War at AEC?

A second round is building up over the questions: Should atomic power development be left in the hands of private industry? Or should the U. S. take over and push through a crash program?

A split exists in the Atomic Energy Commission. Comission-er Thomas E. Murray says: "The present prospect of getting any substantial quantity of industrial atomic power in this country by 1960 is gloomy — and getting gloomier every day."

Chairman Lewis L. Strauss is committed to private development. He says a crash program would be wasteful because the state of the art does not allow construction of economic power reactors.

Meet Orville K. Schmied: The newly appointed deputy director of the Business & Defense Services Administration's Aluminum & Magnesium Division will serve with the government about six months. His regular post is director of research and development, Cochran Foil Co., Louisville. He may be reached in Washington at Commerce department, room 4807. Phone Sterling 3-9200, ext. 4437.

Export Accent

Private industry will be called on to play a bigger role in world economic development to stave off the threat of world Communism. More cajoling and encouragement are on the way from Uncle Sam. Likely are more favorable tax treatment of earnings from foreign investment, more certainty that capital and profits can be brought out, guarantees against expropriation.

American investment abroad now tops $18 billion; exports and imports in 1955 were over $25 billion—more growth is predicted.

Turbine Tooling

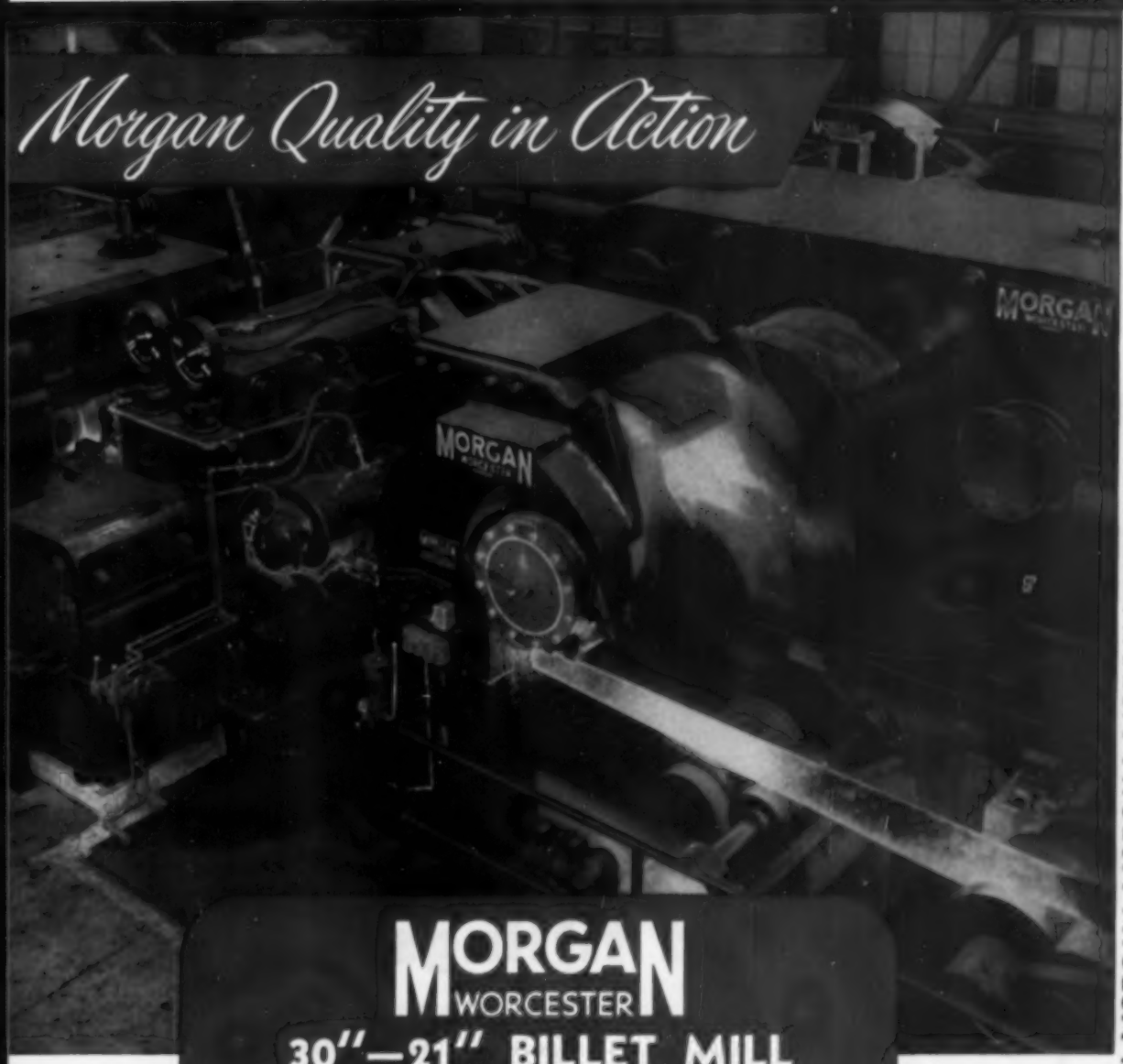
Procurement of $40 million worth of machine tools for the Marine Turbine & Gear Rounding Out Program (STEEL, May 28, p. 72) is finally getting under way. Most of the buying will be done by turbine and gear manufacturers acting as agents for the General Services Administration.

Tools needed to fill out mobilization capacity for the big gears and turbines will include heavy duty boring mills, broaches, drilling machines, grinders and lathes.

Before any buying starts, though, the contractors and GSA have to come to agreement on specifications. Governmental tool inventories must be surveyed—and one estimate on how long that will take is as good as another.

Taking part in the program: Allis-Chalmers, DeLaval Steam Turbine, Elliott Co., Westinghouse, GE, Western Gear Corp., Farrel-Birmingham, Bethlehem Steel, Falk Co. and Newport News Shipbuilding & Drydock.

Morgan Quality in Action



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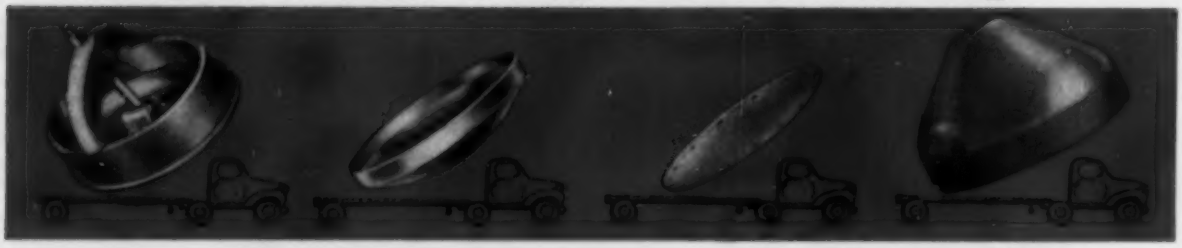

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IHC's Torgersen Meets the People

EACH FRIDAY morning eight employees at International Harvester Co.'s Tractor Works sit down with the "top man" in his office to talk.

Topic: Anything that comes to mind. Objective: For the men to get personally acquainted with their works manager, H. A. Torgersen, and he with them.

Know Your Boss—"It's a form of communication," Mr. Torgersen explains. "I remember that as a millwright's helper at Harvester's Wisconsin Steel Works (my first IHC job), it wasn't the distance that made the top man's office seem so far away from my station; I just didn't know him.

"What we're accomplishing in these meetings, then, is a better understanding of each other's job. We try to give the men a clearer picture of their job and how it relates to plant activities. And how these, in turn, fit into the company's over-all operations."

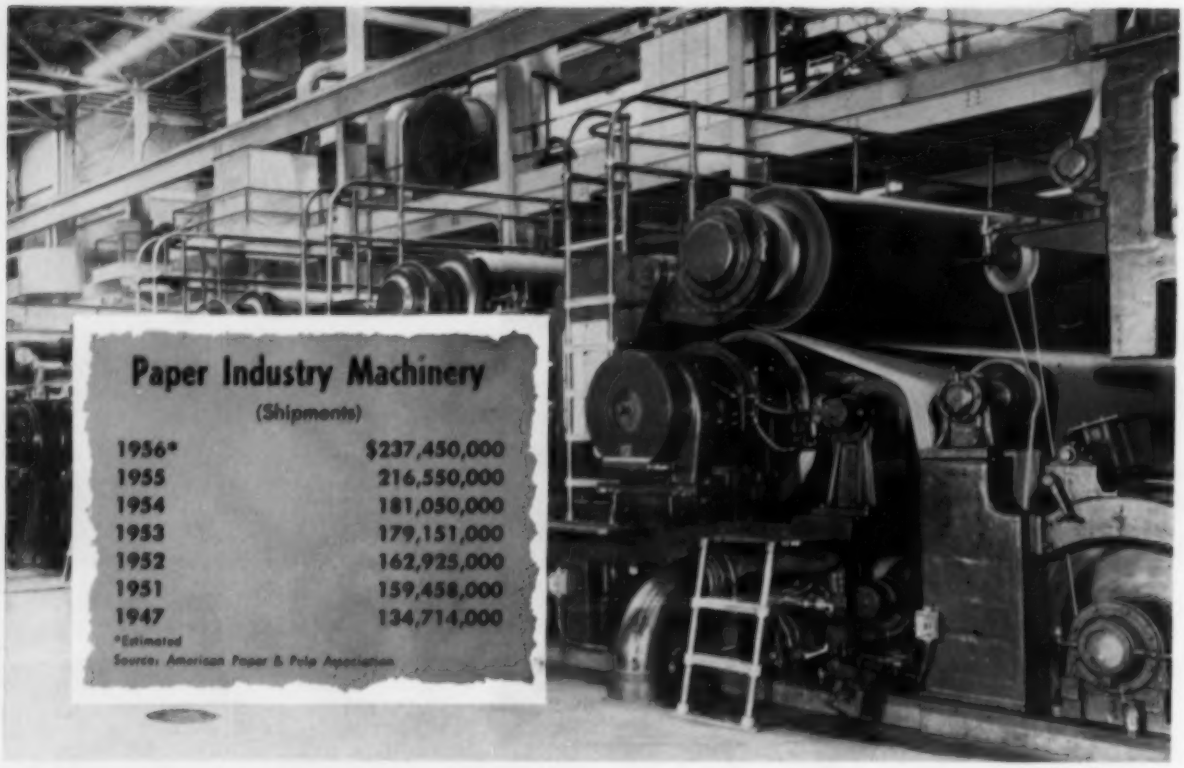
Speaking Up—Mr. Torgersen has no control over the selection of the men attending each week. They're picked at random by the training department. The group is held to eight so that during the hour-long sessions every man has the opportunity to speak up at least once.

"To break the ice, I usually start out by briefly recapping my career with Harvester," says Mr. Torgersen. "Then I encourage each man to do the same. From then on, anything can come up—business conditions, the company's competitive situation, fishing spots, television."

Primarily designed as get acquainted sessions, the meetings often develop constructive ideas. Sometimes, for example, a complaint may be voiced which management didn't know about. At the Tractor works, good housekeeping receives constant emphasis, and several good ideas for projects and programs have come from these meetings.

Refreshing—The Friday get-togethers have been so successful that Mr. Torgersen has expanded them to include office employees and supervisors, as well as shopmen. "It's 1 hour of the week that's really refreshing," he relates.

Following his first job in 1929, Mr. Torgersen moved to the McCormick works, then became a welder and later foreman at the Tractor works. In 1942, he became assistant superintendent at the Bettendorf works (Harvester's wartime tank plant) and later was acting works manager. At the Farmall works, he was general superintendent; in 1949, he went to the Louisville plant as superintendent and moved up to the post of assistant works manager. He returned to the Tractor works as works manager last year.



Black-Clawson Co.

Paper Machinery Needs Up

Per capita consumption of paper in this country now stands at 425.4 lb, compared with 343.7 lb in 1947. The rate has been moving up steadily since 1954

BUILDERS of paper mill machinery have backlogs running into 1958. They are hard pressed to increase their capacity.

About 32 million tons of paper will be rolled this year, about 2 million tons more than last year. Shipments of paper making machinery will be about $237.5 million (see table), a substantial increase over 1955's.

On Order—There are 70 paper making machines on order or under construction, including unbleached kraft paper units of the fourdrinier type.

Black-Clawson Co., Middletown, O., is building the largest fourdrinier machine ever designed.

The unit, which is 342 in. wide, has a daily capacity of 350 tons of paper.

The backlog at Rice Barton Corp., Worcester, Mass., includes a newsprint machine which will cost $1.75 million. Its daily output will be 100 tons. To be installed in Cardenas, Cuba, it will consume pulp produced from sugar cane waste.

Background—Some 55 companies build equipment for pulp and paper mills. The manufacturing cycle from order to installation runs from one year to 18 months.

Because of the high corrosion factor, temperature range and pressures involved in paper and pulp production, replacement equipment and maintenance costs are high.

The maintenance rate is about 10 per cent of the annual volume of the equipment.

Expensive—One contract specifies $4.8 million per unit—$3-million price tags on modern high production machines are not unusual.

More stainless steel is being used. As many as 100,000 separate parts are used in some assemblies, which may weigh 600 to 1200 tons.

Pulp digesters, huge steel plate kettles, weigh up to 170 tons.

Roll Outlook—Paper mills are buying rolls at a rate 15 per cent ahead of 1955's. In paperboard mills, the trend is away from wood rolls to metal—brass, aluminum, stainless steel—and rubber-covered types.

Notes D. A. Kuniholm, roll division, Rodney Hunt Machine Co., Orange, Mass.: "The most significant trend in rolls is the increased use of stainless steel table, wire and breast rolls. They're replacing brass rolls. Stainless wears longer, is nearly twice as stiff and tends to maintain a cleaner surface."

Expansion—Beloit Iron Works, Beloit, Wis., is completing a multimillion dollar expansion program. Rice Barton is making plant addi-

tions to increase production facilities 25 per cent.

Allen Hyer, vice president, Black-Clawson, thinks the paper industry will be spending $1.6 billion on new equipment within the next four years. He says: "Our $50-million backlog is coupled with plans for $3 million worth of new equipment and a retooling program."

AEC Plans Uranium Buying

The AEC's new domestic procurement program guarantees a market for uranium concentrates through Dec. 31, 1966. It goes into effect on Mar. 31, 1962, when the current plan expires.

The price under the new plan is $8 per pound of U_3O_8 contained in normal mill concentrates or precipitates. Purchases from any one source may be limited to 500 tons.

The AEC anticipates a gradual transition from a government controlled to a commercial uranium market as industrial demand develops.

The initial production bonus has been extended from Feb. 28, 1957, through Mar. 31, 1960. This bonus is paid on the first 10,000 lb of uranium oxide and ranges from $1.50 a pound for ore assaying 0.10 per cent to $3.50 for ore which is 0.20 per cent or more uranium oxide.

Combo Boosts Coal Exports

The American coal industry, the United Mine Workers and principal coal-hauling railroads have joined forces to acquire ships and export coal.

Walter J. Tuohy, president of the Chesapeake & Ohio Railway, told the National Coal Association in Washington that the group, American Coal Shipping Inc., has been capitalized at $50 million.

He said that foreign users are buying coal on three and five year contracts. Over 40 million tons are being exported this year. He predicts that U. S. shipments can hit 100 million tons a year.

The hard core of Europe's demand for U. S. coal is for metallurgical purposes—these consumers used 17.5 million tons of our coal in 1955. They want to increase purchases to 22.5 million tons this year.

Bearing Maker Rides Boom

About 400 persons are needed to produce less than 10 lb of the product per day. Sales value of these miniature ball bearings: $10,000 to $15,000 per day

THE COMPANY with the above production and sales statistics is Miniature Precision Bearings Inc., Keene, N. H. It makes a line of miniature ball bearings which includes 500 standard types and sizes (to $\frac{3}{8}$-in. OD).

MPB's annual metal requirements: About 8 tons of high carbon alloy chrome steel and stainless, plus small amounts of beryllium copper.

Growth—In 1949, the company had 60 employees. Today, riding the boom in the electronic and instrument fields, this producer has moved into a new plant which will boost its '56 production to 1.5 million bearings. Last year's shipments: About 1 million.

Miniature and subminiature types are finding expanding uses in such items as recorders, time locks, barometers, potentiometers and seismographic pendulums. MPB estimates that about 80 per cent of its production finds its way into military end items.

Problems — While most companies worry about how to automate the transfer of materials or semifinished products from one machine to another, miniature ball bearing makers can still rely on manual handling. But a lion's share of the technical staff's time is spent in making time and motion studies and modifying standard types of machine tools to do multiple operations on small-to-hardly-visible inner and outer rings, ball retainers and shields. Multiple machines which do two or more operations are gaining in popularity.

"We must be able to convince our production workers that quality is much more important than speed," comments Horace D. Gilbert, president. Adds W. M. Scranton, executive vice president: "While we have gaging and testing stations at almost every point, the quality of each bearing depends to a certain extent on the feel the worker has for his operation."

Outer diameters of inner and outer miniature bearing rings are ground to tolerance on semiautomatic centerless grinders at Miniature Precision Bearings Inc.

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The mechanical properties of J&L Extruded Sections are equal to or superior to those obtainable from equivalent grades conventionally cold drawn. Cold drawn tolerances are accurately maintained. The excellent surfaces of these Extruded Sections require little—if any—finishing operations.

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Chrysler Corp.

This radiation detector saves money and time as . . .

Auto Men Use Hot Stuff

RADIOACTIVE isotopes may save auto makers $10 million this year.

The Department of Commerce reports that 65 auto companies and part suppliers are using atomic irradiation for testing and production control.

Typical—More uses for the isotopes are turning up in automotive research labs and in manufacturing operations. C. R. Lewis, chief engineer, nuclear research, Chrysler Corp., says the hot stuff is particularly useful in wear tests of components.

Poorly designed ignition coils, for example, cause excessive wear on distributor contact points. Chrysler brought a distributor into the lab and made the points radioactive.

A scintillation counter checked point wear when different kinds of ignition coils were used (see photo above). **Result:** "A new ignition coil design has greatly lengthened point life," says Mr. Lewis.

Photos — Another common test measures distribution of wear on cylinders, he adds. A photographic film is placed against inner cylinder walls. The piston rings are made radioactive.

In operation, the isotopes expose film at points of greatest wear. "That's mostly at the top and bottom, where the piston is exposed to less lubrication and hotter gases," Mr. Lewis points out. This test helps engineers to develop different types of lubricants, may possibly change ring and cylinder designs.

Tracers — More recent applications find gaseous radioactive tracers being used to test air flow in automotive air conditioners. The effectiveness of oil filters can be checked by measuring radioactive content of oil before and after it passes through the filter.

Making the lead content of gasoline radioactive allows it to be traced through engine combustion and exhaust systems. Deposits show up on trouble spots. This aids in redesigning combustion chambers, exhaust systems and in finding more corrosion resistant valve materials.

Production—Tests like those Mr. Lewis talks about usually must be conducted in laboratories. Manufacturing groups look for production uses where parts don't have

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Flick the Shift Lever To Get Four-Wheel Drive

GMC Truck & Coach Division says six basic models in its line of light duty trucks (½ to 1 ton) now have four-wheel drive as factory installed optional equipment. They are available with manual or Hydra-Matic transmissions

to be radioactive. Hot parts can't be shipped until they're decontaminated.

This calls for testing and control devices which won't interfere with production or cause part destruction. Scientists call this nondestructive, noncontact testing.

Talk—H. A. Tuttle, supervisor, applied physics lab, and Dr. G. E. Noakes, engineering physicist for Ford Motor Co.'s manufacturing research department, talked about some of these applications at the summer meeting of the Society of Automotive Engineers in Atlantic City, N. J., a few weeks ago. Here are some samples:

Ford's steel division used radiography to check what appeared to be external defects in nine 100-ton capacity slag pots. A small pellet of radioactive isotope, Cobalt 60, was suspended inside each vessel. Photographic film was placed over each suspect area. Gamma rays, penetrating through cracks and defects, darkened the film and pointed out weakened areas.

Leveler—The company also has replaced pneumatic probe gages for checking stock height in cupola stacks. It uses a gamma ray gage to see if stock levels are at the right mark. The gage is coupled with the charging control mechanism.

Other uses mentioned by Dr. Noakes and Mr. Tuttle include continuous measurement of sheet steel during rolling operations, tracing and analyzing boron content in steel and removing dust and lint (fire hazards) with radioactive static neutralizers.

Costs—Mr. Tuttle says that radioactive testing devices can cost over $50,000. Electronic circuits make up most of the cost. Isotopes themselves are relatively cheap, compared with the rest of the equipment, he asserts. Prices are coming down as equipment makers bring out simpler units.

J. R. Niles, president, Radioactive Products Inc., Detroit, reports his firm is developing a standard density gage which will cost from $1800 to $3000. The company just finished making six charge level indicator controllers for Ford's cupolas. "The complete unit for each pair of cupolas costs between $2000 and $3000," he adds.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,689	674,951
March	575,530	792,436
April	547,766	752,245
May	471,994†	723,868
5 Mo. Total	2,763,058†	3,603,008
June		648,412
July		658,696
August		613,705
September		460,443
October		517,788
November		749,061
December		682,256
Total		7,933,369

Week Ended	1956	1955
May 19	105,869	176,441
May 26	108,230	167,555
June 2	77,451	125,018
June 9	105,074	134,673
June 16	101,514†	139,743
June 23	102,500*	151,249

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Big Three Shoots Back

The Big Three among Detroit auto makers continue to lash out at proposed federal legislation aimed at manufacturers' distribution and franchise systems.

The bill would give the Federal Trade Commission power to prohibit auto makers from forcing extra cars on dealers; make car companies buy back surplus new cars from dealers; and limit company rights to cancel dealer franchises.

Dealers—William Gosset, a Ford vice president, testified that the bill (if passed) might lead auto makers to develop a new distribution system, doing away with dealer franchises.

Although it seems doubtful that the bill will go much farther, the industry has kicked this sales system topic around a long time. One proposal is to sell cars like household appliances, either through orders or company owned outlets.

Discrimination — William Hufstader, GM's vice president of distribution, told a Senate Commerce subcommittee that the bill is "anticompetitive and contrary to basic objectives of free enterprise."

Chrysler Corp. asserts: "The bill, if enacted, may quite possibly increase the cost of cars. The effect on the industry would be lowered production with consequent bad effects on employment, supplier industries and the national economy in general."

FACTS

about

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Split Inner Ring Main Shaft Ball Bearing

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High speeds, high temperatures and heavy loads . . . both radial and thrust . . . characterize bearing applications for turbines used in present ultra-fast aircraft.

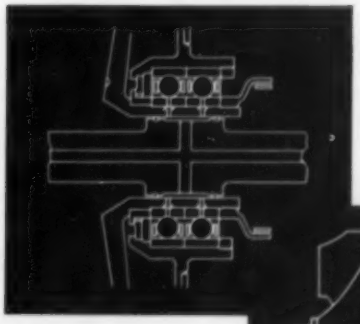
New Departure's Aircraft Bearing Research Program has produced ball bearings for highly satisfactory operation in small, medium and large turbines and their accessories.

Under this program, ball bearings of different steels dimensionally stabilized for high-temperature operation have been developed and produced. Needs for bearings with high-thrust capacity and varied lubricating methods have been met. And, bearings with various geometrical specialities to satisfy difficult mounting and operational requirements were designed.

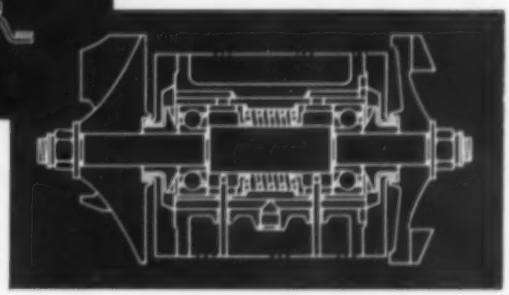
Beyond this, New Departure is working on bearing developments for the more powerful, faster aircraft of tomorrow.

For further details, send for Folder TB, on turbine bearings.

Accessory Ball Bearings



LEFT: Split Inner Ring Bearings on Turbine Main Shaft



RIGHT: Typical Installation of Ball Bearings in a Refrigeration Turbine

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How to make your automatic machine tools even more automatic—at no extra cost

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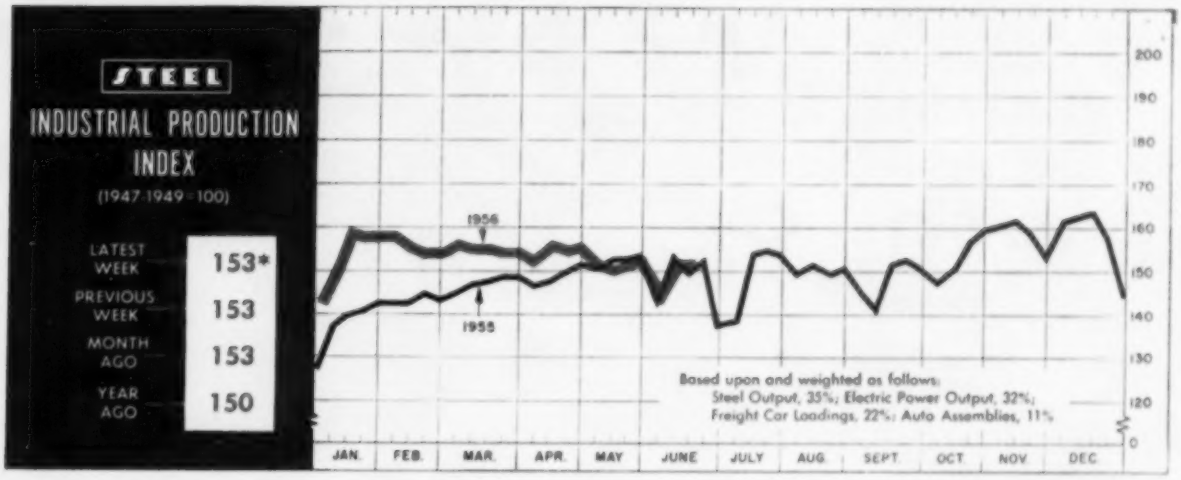
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended June 16

Price Hikes May Be More than Pass-Ons

MAKE no mistake about it—the price trend in the second half is going to be sharply upward. At least three forces will be at work. The first two, increases in the cost of labor and raw materials, will trip off the third: Industrial expansion will cost even more, and part of this added burden must come from higher prices.

"It isn't a matter of how much prices will rise," one metalworking economist told STEEL. "It's a matter of when. A simple boost in steel prices would be easy enough to absorb, but sooner or later the higher cost of labor will make the rounds and force prices up."

"How much?" is still an important factor. It may be enough to push the government's wholesale price index up about 1 percentage point a month for four to six months after steel wage negotiations are settled. That would result in a record high of about 120 (1947-1949=100).

Resistance — Despite a rise of about 3 percentage points in the wholesale price index this year, the consumers' price index has remained fairly stable since late 1953 (see chart, page 66). Lower farm prices have accounted for much of the stability, but many manufacturers and retailers have also been forced to toe the line on price because of competition. Appliances offer a good example of this. But the rest of this year will probably see a reversal of that attitude. Many businessmen feel that they have absorbed about all the increased costs they can, and from now on they will have to pass them on. This undoubtedly will raise the cost of living above the previous high level of October, 1953, when the consumers' price index hit 115.4 (1947-1949=100).

Another indication of "how much?" is given by the respondents to STEEL's midyear survey of metalworking executives (see page 47). They say their selling prices will rise between 3.2 and 4.8 per cent over those of the first half. But many of the respondents indi-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,355[1]	2,299	2,292
Electric Power Distributed (million kw-hr)	10,900[1]	10,951	9,987
Bituminous Coal Output (1000 tons)	9,740[1]	8,850	9,345
Petroleum Production (daily avg—1000 bbl)	7,000[1]	6,998	6,626
Construction Volume (*ENR*—millions)	$511.9	$250.2	$328.0
Auto, Truck Output, U. S., Canada (*Ward's*)	135,994[1]	139,255	178,475
TRADE			
Freight Car Loadings (1000 cars)	780[1]	787	785
Business Failures (Dun & Bradstreet)	262[1]	257	214
Currency in Circulation (millions)[3]	$30,542	$30,505	$30,058
Dept. Store Sales (changes from year ago)[3]	+9%	+7%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,144	$22,459	$19,902
Federal Gross Debt (billions)	$276.3	$276.5	$277.5
Bond Volume, NYSE (millions)	$15.2	$21.1	$24.4
Stocks Sales, NYSE (thousands of shares)	8,875	9,882	13,388
Loans and Investments (billions)[4]	$84.7	$84.7	$84.0
U. S. Govt. Obligations Held (billions)[4]	$26.7	$26.9	$32.8
PRICES			
STEEL's Finished Steel Price Index[5]	210.45	210.45	194.53
STEEL's Nonferrous Metal Price Index[6]	276.2	275.5	238.1
All Commodities[7]	114.2	114.2	110.2
Commodities Other Than Farm & Foods[7]	121.4	121.4	115.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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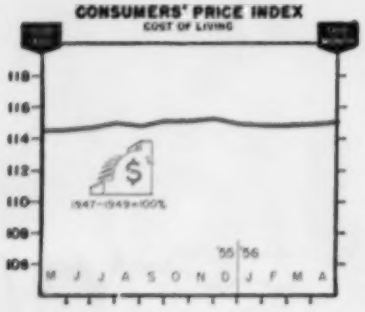
THE BUSINESS TREND

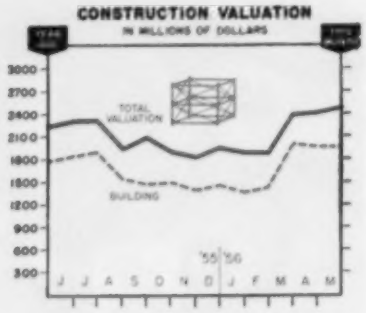
CONSUMERS' PRICE INDEX
COST OF LIVING



	1956	1955	1954
Jan.	114.6	114.3	115.2
Feb.	114.6	114.3	115.0
Mar.	114.7	114.3	114.8
Apr.	114.9	114.2	114.6
May	....	114.2	115.0
June	....	114.4	115.1
July	....	114.7	115.2
Aug.	....	114.5	115.0
Sept.	....	114.9	114.7
Oct.	....	114.9	114.5
Nov.	....	115.0	114.6
Dec.	....	114.7	114.3

U. S. Bureau of Labor Statistics

CONSTRUCTION VALUATION
IN MILLIONS OF DOLLARS



37 States

	Total		Building	
	1956	1955	1956	1955
Jan.	1,858.2	1,504.5	1,355.7	1,255.1
Feb.	1,859.7	1,581.1	1,429.3	1,278.6
Mar.	2,382.0	2,134.8	1,986.5	1,748.6
Apr.	2,421.5	2,322.1	1,965.6	1,776.1
May	2,479.8	2,185.1	1,948.7	1,737.1
June	.....	2,255.2	.....	1,793.7
July	.....	2,271.5	.....	1,851.6
Aug.	.....	1,894.8	.....	1,516.9
Sept.	.....	2,034.9	.....	1,442.2
Oct.	.....	1,862.7	.....	1,474.8
Nov.	.....	1,796.8	.....	1,388.3
Dec.	.....	1,920.8	.....	1,438.0
Total	.....	23,764.3	.....	18,701.0

F. W. Dodge Corp.

Charts copyrighted, 1956, STEEL.

cated they will have to swallow any cost increases. One metalworking plant manager said: "We are being squeezed by higher prices of materials and labor with no chance to increase our selling price, because the large manufacturers are holding or cutting their prices to maintain and increase their volume." Another said: "We anticipate an increase in sales, but at prices which show a lower net profit. We are booking orders at firm prices for delivery in the third and fourth quarters. We must assume any increases in cost of materials."

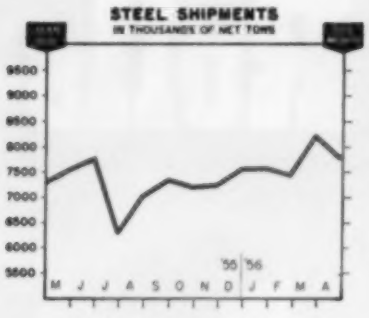
Squeeze — It is generally the small or medium-sized company which is feeling the cost-price squeeze the most. Many feel they have gone about as far as they can with production economy and must now pass on the costs. In fact, some—such as auto part suppliers—probably will try to pass on any price increases and a little more, because they feel they are being squeezed plenty now. This will contribute to the expected hefty increase in the price of new model autos in the fall. Gear manufacturers, also, might add some extra to the pass-on, hoping to raise some expansion capital.

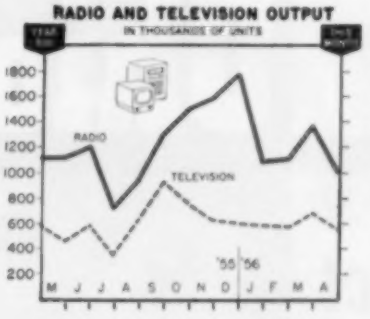
Historically, machine tool builders have let price boosts lag behind building cost increases. In the fourth quarter (perhaps the end of the third), they may be forced to bump prices by as much as 15 per cent.

Construction Holds Strong

"One of the most significant aspects of the economy as we see it is construction. We see a great deal of strength there for a long time to come," a steel executive observed last week. And well he might. All available statistics on the industry still point to a record year. The Labor and Commerce departments report that May construction activity matched the record of $3.7 billion for that month, which was set last year, and boosted the total for the first five months of 1956 to about $15.8 billion. The May annual rate was $43.6 billion, compared with the annual rate of $43.1 billion in January and actual outlays of $43 billion last year.

Total construction in the 37 eastern states set a record in May, according to F. W. Dodge Corp. (see chart above). While building was down slightly from the





	Net Tons		
	1956	1955	1954
Jan.	7,587,870	6,009,958	5,727,600
Feb.	7,468,393	6,119,900	5,364,978
Mar.	8,255,824	7,268,795	5,583,690
Apr.	7,783,873	7,279,321	5,287,972
May		7,540,889	5,423,168
June		7,770,213	5,887,488
July		6,250,597	4,490,179
Aug.		7,053,615	4,681,242
Sept.		7,378,247	5,004,222
Oct.		7,216,821	5,035,364
Nov.		7,247,994	5,240,209
Dec.		7,580,943	5,448,649

American Iron & Steel Institute

	Radio		Television	
	1956	1955	1956	1955
Jan.	1,079	1,068	588	655
Feb.	1,094	1,090	576	703
Mar.	1,360	1,482	680	831
Apr.	993	1,100	550	583
May		1,114		467
June		1,205		590
July		718		344
Aug.		948		648
Sept.		1,302		940
Oct.		1,500		760
Nov.		1,581		632
Dec.		1,786		605
Total		14,895		7,757

Radio-Electronics-Television Mfrs. Assn

previous month, strong public works and utility activities more than made up the difference.

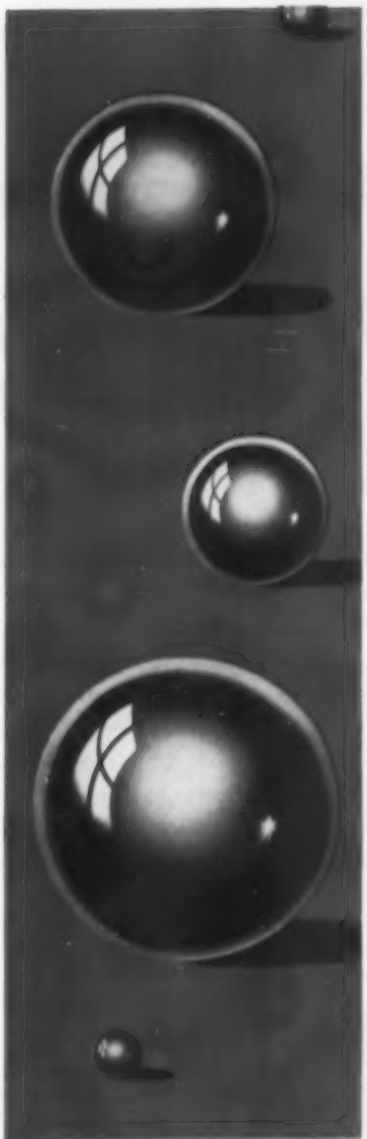
Housing still remains the weak link in the construction picture with little chance of making up the losses suffered in the early part of the year. Even Albert Cole, the federal housing chief, is showing some doubt about the possibility of hitting 1.3 million starts this year. He says the government has under consideration several steps to help reach that goal, but with starts at an almost constant annual rate of 1.1 million so far this year, it will take extraordinary activity in the last half to reach the goal.

Trends Play Game of Tag

STEEL's industrial production index trend line can be expected to play tag with the 1955 line for the remainder of this year (see page 65). And it may come in a close second in the game. While 1955 started at a comparatively low level and worked its way to record heights in the fourth quarter, 1956 started at that high level and has had a tendency to settle just below it. From here on out, if the 1956 line can match or rise above the year-ago level, it should be considered a sign of good business. Chances of doing this in the third quarter are slim. If there is a strike, the reason is obvious. If there is no strike, lower steel mill operations alone will make the difference. They'll be off to an average of 85 per cent (some weeks below that). Auto production is running about 105,000 units a week and probably will not go much lower. Electric power output is entering the season when air conditioners will uphold the high level of demand. Carloadings will remain near 780,000 cars a week during the remainder of the iron ore season. In the fourth quarter, though, the steel mills will pick up, new models will beef up automotive production, and electric power will head for seasonal highs. Car loadings will decrease seasonally.

Production Shows Stability

Industrial production in May stood at 142 per cent of the 1947-1949 average, according to the Federal Reserve Board. This is 1 percentage point below the April level and 1 point above the low for this year set in March.



COOLIDGE
Balls

CHROME ALLOY
AND
STAINLESS

COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls

Chemically Correct Metallurgically Sound

Through the entire complex and exacting process of manufacturing OHIO ROLLS, Ohio's metallurgists, chemists, engineers and inspectors are continually analyzing, testing and inspecting. Their job is to make sure that every Ohio Roll meets exact specifications for metal analysis, hardness, tensile strength, dimension and finish. Ohio's quality control techniques and casting skills are your best assurance that Ohio Rolls deliver higher tonnage . . . give longer, more profitable service under critical operating conditions.

When you need rolls—large or small—call in your Ohio Roll Representative. He understands production requirements, and he can help you solve your roll problems quickly and efficiently.

OHIO ROLLS SERVE THE WORLD

shaping metal for all industry

Carbon Steel Rolls ● Ohioloy Rolls ● Ohioloy "K" Rolls ● Ohio Double-Pour Rolls
Chilled Iron Rolls Dense Iron Rolls ● Nickel Grain Rolls ● Special Iron Rolls
Nioloy Rolls ● Flintuff Rolls ● Forged Steel Rolls

THE OHIO STEEL FOUNDRY COMPANY

LIMA, OHIO

Plants at Lima and Springfield, Ohio

R. O. PETERSON
. . . Osborn Mfg. vice president

CLARK R. HIBBARD
. . . Fosdick Machine Tool sales mgr.

J. ROBERT TOMLINSON
. . . Tube Reducing executive v. p.

R. O. Peterson was elected vice president, brush division-engineering, by **Osborn Mfg. Co.**, Cleveland. He joined Osborn in 1936 as manager of its technical department.

Morse Twist Drill & Machine Co., New Bedford, Mass., appointed **Frank Curtis** carbide tool co-ordinator. He is replaced as Detroit district manager by **Lewis Campbell. Frank C. Johnson** was made district manager for Ohio.

These changes in **Youngstown Sheet & Tube Co.'s** purchasing department at Campbell, O., follow the retirement of **H. H. Waldschmidt,** director of purchases: **James D. Sloan,** purchasing agent, continues in that position and will supervise all department activities. **Thomas G. Lewis** was made assistant purchasing agent. **Merwin C. Jones,** in addition to buying, was made office manager.

R. H. Isbrandt, executive engineer, was appointed director of engineering for **American Motors Corp.**, Detroit.

Earl C. Beatty was named chief metallurgist at the Halethorpe, Md., Extrusion Works of **Kaiser Aluminum & Chemical Corp.**

David F. Putnam was elected president, **Markem Machine Co.**, Keene, N. H. He succeeds **Claude A. Putnam,** now chairman.

Clark R. Hibbard was promoted to sales manager, **Fosdick Machine Tool Co.**, Cincinnati. He was associated with Yates-American Machine Co. in design and sales engineering before joining Fosdick in 1954.

Skinner Chuck Co., New Britain, Conn., elected **D. M. Stevenson** vice president-sales; **G. A. Goepfrich,** vice president - engineering; and **R. D. Twohig,** vice president-financial, legal and other staff activities.

C. E. Gumbert Jr. was made chief engineer of **Elbeeco Inc.**, Jackson, Mich., a subsidiary of Aeroquip Corp. He was formerly with the quality control department of Aeroquip's Jackson Division. **Mathias A. Gatzweiler** was made production control manager for Elbeeco.

In **United States Steel Corp.'s** research and technology division, Pittsburgh, **Edgar C. Bain** was made assistant executive vice president-operations; **J. B. Austin,** vice president - fundamental research; and **M. W. Lightner,** vice president-applied research. The appointments are effective July 1.

Andrew E. Josephson was made production manager and director of purchasing for **Jarvis Power Tools Inc.**, Middletown, Conn, subsidiary, Jarvis Corp.

J. Robert Tomlinson, executive vice president, was elected president of **Barden Corp.**, Danbury, Conn. He succeeds **F. E. Ericson** who has resigned for reasons of health but will serve as a consultant.

R. H. Jones was made general manager, air conditioning division, **General Electric Co.**, at Bloomfield, N. J. He was general manager of the GE low voltage switchgear department in Philadelphia.

Lyle F. Gulley, works manager, **Granite City Steel Co.**, Granite City, Ill., was elected vice president-operations.

James R. Keough was appointed manager of manufacturing at **Fenwal Inc.**, Ashland, Mass. He joined the company in 1951 and has served as manager of personnel, purchasing and production activities.

Carl Halpin was appointed manager of engineering, **Ross Operating Valve Co., Detroit.** He was president of F. L. Jacobs Co.

A. James Fisher was made general sales manager, **Metal & Thermit Corp.**, New York.

V. J. Plouffe joined **Ruud Mfg. Co.**, Kalamazoo, Mich., as a technical assistant to the sales manager. He was central sales manager, Dutton

LAWRENCE L. GARBER

EUGENE SALINGER

. . . executive changes at H. K. Porter and Henry Disston

Boiler Division, Hapman-Dutton Co.

Lawence L. Garber fills the new post of vice president-production at **H. K. Porter Company Inc.**, Pittsburgh. He is succeeded by **Eugene Salinger** as general manager, **Henry Disston Division**, Philadelphia. Mr. Salinger joined Porter early this year as assistant general manager, Riverside Metal Division. He had been president of Bayshore Industries.

S. M. Bevins was named assistant manager, grating department, **Blaw-Knox Co.**, Pittsburgh.

Charles G. Rigdon fills the new post of barrel finishing engineer for **Frederic B. Stevens Inc.**, Detroit.

John C. Angle was made Philadelphia district sales manager of **Horace T. Potts Co.**, a newly created post.

George L. Leupold was made assistant general sales manager, **Fulton Sylphon Division**, Robertshaw-Fulton Controls Co., at Knoxville, Tenn.

Dr. Howard O. McMahon was elected vice president, **Arthur D. Little Inc.**, Cambridge, Mass.

Dr. Russell C. Buehl, formerly chief of the Bureau of Mines Pyrometallurgy Laboratories in Pittsburgh, joined the staff of **Rem-Cru Titanium Inc.**, Pittsburgh. He will study and develop new melting techniques for titanium alloys.

Ferro Corp., Cleveland, appointed **Robert Skinner** process engineer, frit division; and **Rudy Foster**, factory superintendent, frit plant.

Frederick A. Gilbert was elected president, **Becco Chemical Division**, Food Machinery & Chemical Corp., Buffalo. He succeeds **Dr. Max E. Bretschger**, retired.

Electro-Mechanical Products Co., Garden City, Mich., elected **John Stap Jr.** vice president-manufacturing and **Chester Quantz**, vice president-engineering.

A. E. Smith and **A. C. Drake** were named to new posts in the general engineering department of **Electro Metallurgical Co.**, a division of Union Carbide & Carbon Corp., Niagara Falls, N. Y. Mr. Smith was made chief project engineer and Mr. Drake, general construction superintendent.

Thomas K. Radcliffe was made district manager, industrial product sales, for the Torrance, Calif., plant of **National Supply Co.**

Harold H. Jeske was elected vice president-operations for **Florence Stove Co.**, Chicago.

Stanley M. Rumbough Jr. was elected president, **American Totalisator Co. Inc.**, Baltimore, subsidiary, Universal Products Co. Inc.

Harvey J. Haughton was elected controller, **Jones & Laughlin Steel Corp.**, Pittsburgh. He succeeds **Harold S. Geneen**, who resigned to become executive vice president of Raytheon Mfg. Co.

George C. Kellogg was made eastern district sales manager at New York for **Plasteel Products Corp.** **George L. Mild** was made manager, plastics department, at the Washington, Pa., home office.

Arthur J. Hatch was elected president, **Strong Electric Co.**, Toledo, O. He succeeds the late **Harry H. Strong.**

Oscar E. Holt was made manager

JOHN STAP JR.

CHESTER QUANTZ

. . . Electro-Mechanical Products vice presidents

A MILE OF BLOOD VESSELS FOR A ROBOT

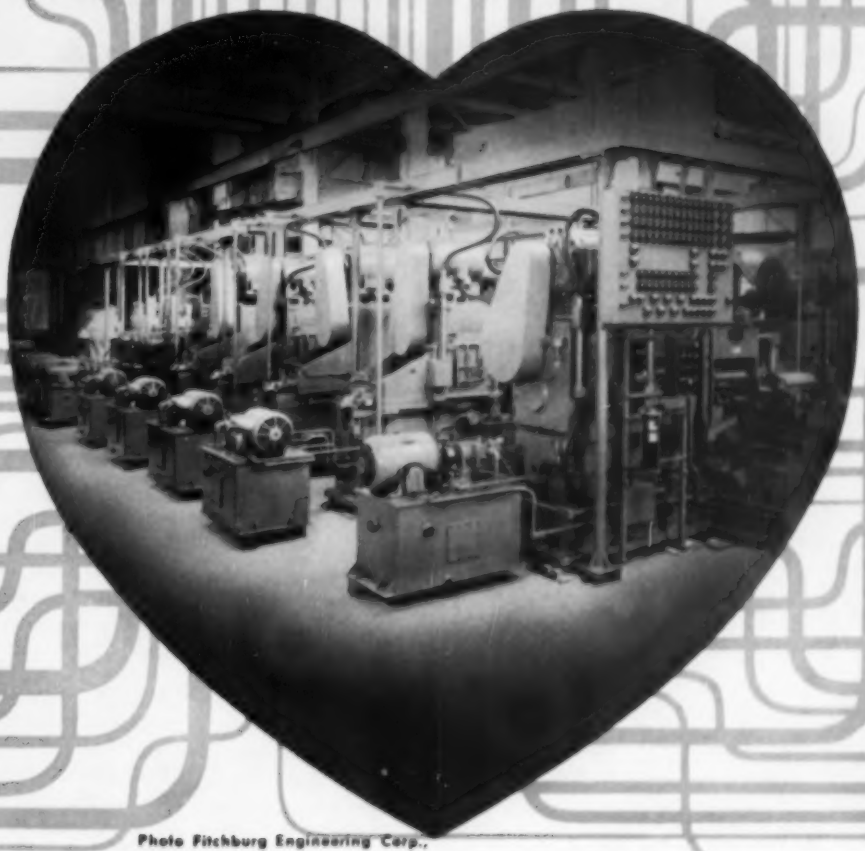


Photo Fitchburg Engineering Corp., Fitchburg, Mass.

This mechanical giant was designed and built by Fitchburg Engineering Corporation. It is a 23-station transfer machine for milling, boring, drilling and reaming automatic transmission cases for new cars. Its "blood vessels" are many sizes of low carbon steel SAE hydraulic tubing by Superior, carrying pressures up to 1000 psi throughout the system. The breakdown of just one "blood vessel" could stop not only the machine but the entire production line—a very costly mischance. Superior tubing was chosen because it provides a dependable, leakproof hydraulic system.

Superior specializes in seamless low carbon steel tubing for all hydraulic purposes. Some sizes can bear working pressures up to 12,000 psi. The steel has a maximum carbon content of only .12%, which results in high ductility, permitting easy hand bending and flaring. This non-aging steel holds its ductility and impact resistance during storage and/or use.

All Superior hydraulic tubing is 100% hydrostatically tested at maximum working pressures. Constant quality control during production assures clean, smooth inside surfaces that minimize pressure drop due to back pressure from internal friction.

If you have hydraulic tubing problems, let Superior's tubemanship and years of industry-wide experience help solve them for you. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa., for Bulletin No. 29 giving additional technical data on hydraulic tubing.

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The big name in small tubing

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All analyses available in .010 in. to ½ in. OD—certain analyses in light walls up to 2½ in. OD

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GEORGE A. CROWTHER
. . . chief eng., Ford Instrument Co.

JOHN P. CARTWRIGHT
. . . Joy Mfg. industrial sales mgr.

ARTHUR J. WILLIAMSON
. . . Tube Reducing executive v. p.

of the **W. L. Maxson Corp.** plant at Old Forge, Pa. He succeeds **A. J. Westmaas.**

George A. Crowther was named chief engineer, **Ford Instrument Co.**, division of Sperry Rand Corp., Long Island City, N. Y. He was engineering director for marine equipment.

Gilbert T. Bowman, general products manager, and **J. W. Northcutt,** southern regional sales manager, were named assistant vice presidents of **Rockwell Mfg. Co.**, Pittsburgh. **Jack H. Walters** succeeds Mr. Northcutt in Atlanta.

F. G. Luber and **W. F. Schreiber** were made assistant sales managers of **Louis Allis Co.**, Milwaukee. Mr. Luber was in charge of gear motor sales and Mr. Schreiber was advertising manager.

H. L. Tigges was appointed consulting sales engineer for **Buhr Machine Tool Co.**, Ann Arbor, Mich. He has been associated with Baker Bros. Inc. for many years.

John P. Cartwright was made sales manager, industrial sales, **Joy Mfg. Co.**, Pittsburgh. He is succeeded as Wasnington district manager by **Arnott J. Lee.**

T. J. Clark was made Northwest division manager at Portland, Oreg., for **Atkins Saw Division,** Borg-Warner Corp.

John P. Tracey was appointed special sales engineer by **Reliable Spring & Wire Forms Co.**, Cleveland. He was an engineer at Timms Spring Co.

John D. Gordon rejoins **Progressive Welder Sales Co.**, Detroit, as general sales manager. He left the company in 1949 to form his own consulting engineering business. Subsequently, he joined Studebaker-Packard Corp. from which he resigned May 18.

John T. Burns was made manager, western region, for aircraft product sales, **Vickers Inc.** He has offices at El Segundo, Calif.

Tube Reducing Corp., Wallington, N. J., appointed **Arthur J. Williamson** executive vice president; **Graham B. Brown,** vice president-operations; **Alvin R. Almquist,** secretary-treasurer; **C. L. Megargle,** general sales manager; and **W. W. Breden,** assistant secretary-treasurer.

Jean A. Lignian succeeds **L. L. Linkins,** retired, as manager, quality control department, **Moraine Products Division,** General Motors Corp., Dayton, O.

Roger T. Landelle was elected president and chairman, **Valdosta Steel Corp.**, Chula Vista, Calif.

Albert Andreiko was made production planning director for **Scott-Atwater Mfg. Co.**, Minneapolis.

Central Electronic Manufacturers Inc., Denville, N. J., which recently became a subsidiary of Nuclear Corp. of America Inc., appointed **Gene Perry** sales manager and **Bernard Bernstein,** chief engineer of its electronic tube division.

OBITUARIES . . .

Cecil B. Thomas, 61, vice president of **Chrysler Corp.**, Detroit, and president, Chrysler Export Corp., died June 11.

Isidor Chaplik, founder and president, **Atlantic Brass Works Inc.**, Chicago, died June 7.

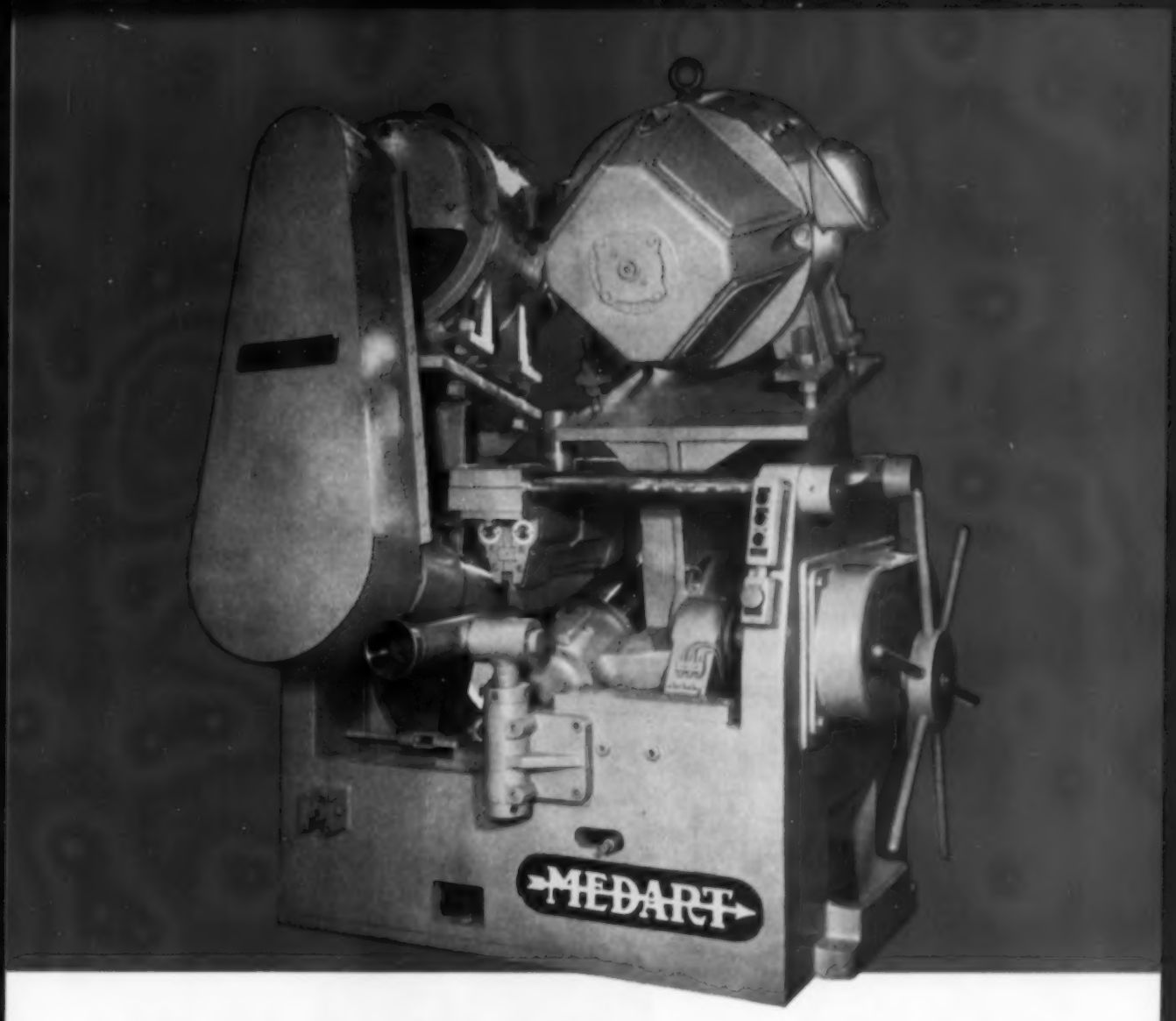
Rudolph F. Lindow, 62, designing research engineer, **Chain Belt Co.**, Milwaukee, died June 5.

Samuel I. Fink, 63, head of **Franklin S. Miles Co.**, Philadelphia, died June 1.

Andrew F. Ammon, 64, superintendent, **Kingsbury Machine Works,** Frankford, Pa., died June 1.

Fred M. Miller, 65, retired director-engineering, **General Refractories Co.**, Philadelphia, died June 5.

Norman C. Robinson, vice president, **Atlas Brass Foundry,** Los Angeles, died June 6.



BLAW-KNOX MEDART makes what it takes

for high speed straightening of cold finished stock

Designed around the principle used in the famous Blaw-Knox Medart 2 roll Rotary Straightener, the 2 & 2 Universal Straightener is especially adapted for high speed applications. It is widely used in a direct production line with a draw bench for high speed straightening of cold drawn bars.

In this machine, each roll is driven by its own motor through a completely enclosed V-Belt drive. This simplified arrangement keeps downtime and drive maintenance to a minimum. What's more it provides for control of throughput rates by varying the speed of the motors. Roll speeds are synchronized by means of electrical interlocks between the motors.

Space requirements are kept to a minimum through compact design and the small number of working parts. This compact set-up simplifies discharge of work from the machine, making it ideally suited to shorter length workpieces.

The Blaw-Knox Medart 2 & 2 Universal Rotary Straightener and Polisher is available in sizes to handle bars and tubes in diameters of ⅛" to 4½". Contact us for detailed information, technical assistance or service.

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1906-1956

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Foundry & Mill Machinery Division
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HOW **TRAMBEAM**
KEEPS STEEL ON THE MOVE AT

CRUCIBLE STEEL CO. OF AMERICA

Complete area coverage of Crucible Steel's Detroit warehouse is provided by three double girder Trambeam cranes, serving as many bays.

BULLETIN M-26
WHITING CORPORATION
TRAMBEAM

Many firms save money by keeping material and products on the move overhead. Whiting Trambeam Handling Systems are used because they provide the greatest efficiency per dollar invested. Trambeam provides flexible, low-cost handling; full-area coverage; quick, point-to-point transport; safe, easy stacking. In monorail or crane systems, it means an automatic increase in plant capacity.

The best way to look into Trambeam is to see how others are using it. Illustrated are five current case studies—all giving complete data on Trambeam operation in leading firms. Write today for these folders—you'll find them profitable reading.

Whiting Corporation
15643 Lathrop Ave., Harvey, Ill.
Manufacturers of Cranes • Trackmobile • Railroad • Foundry and Chemical Processing Equipment

1. Write for Bulletin M-26 giving data about Trambeam at Crucible Steel Company of America.

Keep Things Moving FASTER and Save Money!

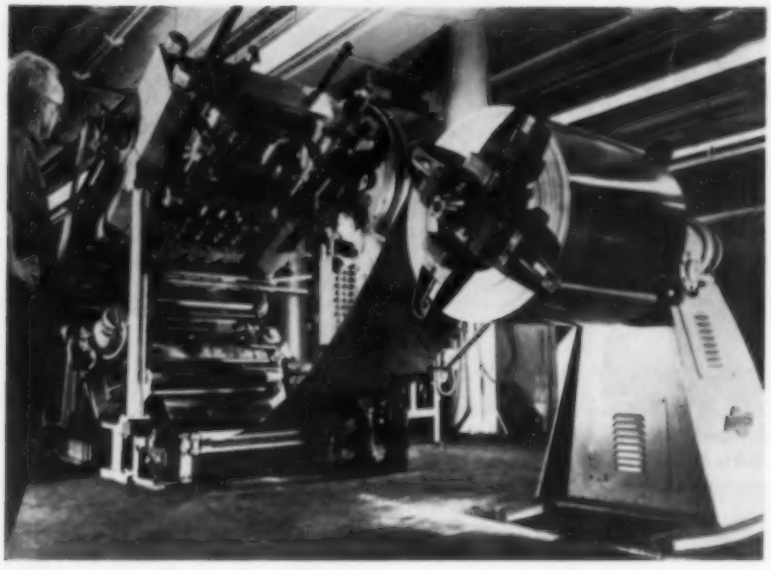
2. Booklet shows Trambeam coverage of storage, shipping and receiving areas for Chase Brass and Copper Co. Bulletin M-31.

3. Here's one man push-button control for loads to 10 tons. See how Verson All-Steel Press Co. does it. Bulletin M-28.

4. Discover how Trambeam speeds production at Westinghouse jet engine plant. That's the story told in Bulletin M-29.

5. Trambeam speeds charging and pouring in the foundry of Allis-Chalmers Manufacturing Co. Write for Bulletin M-27.

WHITING



Die press installed in $7-million laboratory as . . .

Canmaker Boosts Research

RESEARCH could double metal container output in five years (last year, some 39 billion were produced).

That evaluation of the industry's prospects was made by T. C. Fogarty, president, Continental Can Co., at the dedication of the firm's $7-million Research & Development Center at 76th street and Loomis boulevard, Chicago.

Mr. Fogarty said 265 scientists and technicians will be at the center. They will work on problems of new metal containers and nonmetal components, new machinery to make and close containers and new products suitable for packaging in containers made of metals and related materials.

New Markets—Mr. Fogarty predicted that the greatest growth in the production of metal containers over the next decade would come from products not previously packaged in them. Frozen citrus juices, a postwar phenomenon, illustrate market possibilities.

Major goals of research include: Methods of freeing the industry from complete dependence on steel (alternate metals with a declining price curve are being investigated, even though they now may be prohibitively expensive); blends of materials, such as steel and plastic, or steel and fiber, in a single container; more efficient, high speed canmaking and can closing machinery.

Facilities — Continental's new laboratories are fully equipped to achieve those goals, Mr. Fogarty said. Notable among its precision equipment are a complete canmaking pilot plant and a self-contained, can closing line. The Callahan gang die press (above) utilizes coils of steel instead of sheet stock in the high speed manufacture of can ends. An experimental machine shop covers 6500 sq ft.

Lenvik Ylvisaker, general manager of the Metal Division Research & Development Department, is in charge of the Chicago program.

Continental Can also has announced plans for merger with Hazel-Atlas Glass Co, subject to approval by stockholders. This would mark the entrance of the firm into the glass container field.

Aluminum Fabricator Moving

Sunshade Corp., maker of aluminum doors and windows, is moving its manufacturing facilities to a leased, 88,000 sq ft plant in Depew, N.Y. Additional machinery is being installed.

Smith-Gates Corp. To Build

Smith-Gates Corp., Plainfield, Conn., will double production space with a $100,000 plant at Farmington, Conn. The company makes heating equipment, antifreezing devices for water pipes and home ventilating units.

Beckman Buys Lou-Bar Products

Beckman Instruments Inc., Fullerton, Calif., purchased the firm of Lou-Bar Products, manufacturer of precision components for automatic control systems, Santa Monica, Calif.

Motor Maker Plans Expansion

A. O. Smith Corp.'s Electric Motor Division plans to erect a $350,000 administration building in Dayton, O., as the opening phase of a two-year expansion and re-equipment program expected to cost $3,250,000. Other major portions of the program include: A manufacturing plant addition costing nearly $1 million and new machinery and equipment costing nearly $2 million. The division's productive capacity is expected to be increased 50 per cent.

Gemmer, Ross Gear To Merge

Gemmer Mfg. Co., Detroit, will merge with Ross Gear & Tool Co. Inc., Lafayette, Ind., subject to approval by stockholders. If approved, Gemmer operations will be continued as a division of Ross Gear.

Borg-Warner Continues To Grow

Borg-Warner Corp., Chicago, acquired Industrial Crane & Hoist Corp., that city, producer of overhead, job and gantry cranes; hoists and trolleys; monorail systems and crane runways.

Borg-Warners' Long Mfg. Division, Detroit, has completed major stages of a $1-million modernization program. The division, formerly completely automotive and a large supplier of radiators, clutches and torque converters, is expanding into diversified markets. It

is branching out into agricultural, air conditioning, construction, industrial, marine and material handling fields.

Rivet Manufacturer Moves

New England Tubular Rivet Inc., organized only four months ago, has just expanded its operations and moved into larger quarters at 97 Buckingham Ave., Milford, Conn. The company specializes in tubular, solid and special rivets, as well as specialties, such as cutlery and shouldered rivets. Facilities also include secondary operations, such as drilling, cross-drilling, tapping, chamfering, pointing, turning and undercutting.

Kritzer Buys Heating Line

Union Asbestos & Rubber Co., Chicago, sold its Heating Division to Batavia Kritzer Inc., Batavia, Ill.

Koehring, Press Firm To Merge

Koehring Co., Milwaukee, and Hydraulic Press Mfg. Co., Mt. Gilead, O., will merge, subject to stockholders' approval. Koehring is a manufacturer of power shovel, crane, trencher, paver, concrete batching, cement handling and earth hauling equipment. Recent new products include railroad maintenance-of-way machines, pulp grinding and processing equipment and material handling units. The Mt. Gilead firm makes plastic molding and metal casting machines and other types of presses.

Richmond Firm Expands

Richmond Steel Co., Richmond, Va., is moving its steel fabricating departments to a large building at Fourth and Dinwiddie streets, South Richmond, Va. Construction of electrowelded steel barges, work boats and other types of floating equipment will be continued at the firm's Dock street plant, Richmond.

Plans Wire Plant in Canada

Canada Wire & Cable Co. Ltd., Toronto, Ont., will build a manufacturing plant at Simcoe, Ont. Products: Enamel and other coatings for magnetic wires.

Boosts Steel Casting Capacity

Hitchiner Mfg. Co., Milford, N.H., will build a plant addition to house its foundry section, providing space for equipment that will double capacity for investment castings made of steel. An enlarged heat treating department also will be in the new area. Orders have been placed for additional machine tools and material handling equipment.

Clemco Aero Products Formed

J. W. Clement Co., Buffalo, formed a new company, Clemco Aero Products Inc., to manufacture missile and aircraft components in Compton, Calif. The new firm will be operated as a division.

Opens Container Plant

Birmingham Can Inc. has started operations in a temporary plant, pending erection of a larger facility in the Pinson Valley area, near Birmingham. The company is making metal containers.

Conduit Firm Plans Expansion

Clifton Conduit Co. Inc., Baltimore, maker of electric conduits, has launched a modernization and improvement program. Plant capacity will be increased about 10 per cent.

Hoover Electronics Builds

Hoover Electronics Co., maker of electronic equipment, is building a 20,000 sq ft plant on Timonium road in Baltimore county, Maryland. The company, formerly Phebco Inc., was acquired last fall by Hoover Co., North Canton, O.

VACATIONS

William D. Gibson Co., division of Associated Spring Corp., Chicago, will close its plant Aug. 6 through Aug. 17.

General Electric Co's Electronics Division, will close its plants in Auburn and Syracuse, N. Y., at the end of June 28 and will reopen July 16. Receiving departments and offices will be closed.

ASSOCIATIONS

National Fluid Power Association, Evanston, Ill., elected these officers: President, J. J. Pippenger, Double A Products Co., Manchester, Mich.; first vice president, R. J. Murphy, Kalamazoo Division, New York Air Brake Co., Kalamazoo, Mich.; second vice president, J. A. Marsh, Rivett Lathe & Grinder Inc., Boston; treasurer, Ellwood G. Peterson, Hannifin Corp., Des Plaines, Ill. Barrett Rogers is executive secretary.

Machinery Dealers National Association, Washington, elected Austin D. Lucas president. He is president of the Austin D. Lucas & Co. Inc., Bridgeport, Conn., specialist in used machine tools and metalworking equipment. Other officers are: First vice president, Charles Kempler, Interstate Machinery Co. Inc., Chicago; second vice president, Arnold Borgman, J. L. Lucas & Son Inc., Bridgeport; treasurer, E. W. Pfeil, Elmer W. Pfeil Inc., Cleveland. R. K. Vinson is executive director.

Roy A. Peterson, director of purchases for United States Steel Supply Division, U. S. Steel Corp., Chicago, was elected president of the **Purchasing Agents Association of Chicago.** Other officers are: Henry C. Kopp, Anaconda Co., first vice president; Seymour Ellison, Perfection Gear Co., Harvey, Ill., second vice president.

Carlyle M. Ashley, Carrier Corp., Syracuse, N. Y., was elected president of the **American Society of Refrigerating Engineers,** New York.

NEW ADDRESSES

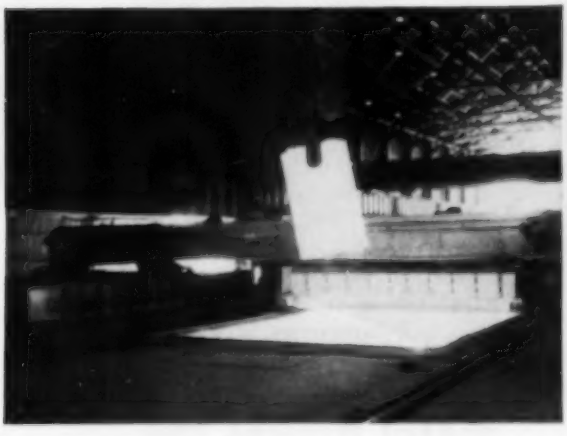
American Iron & Steel Institute moved to 150 E. 42nd St., New York 17, N. Y.

Engineering Supervision Co., consulting and management engineering firm owned by Birdsboro Steel Foundry & Machine Co., moved into larger quarters at 120 W. 42nd St., New York 36, N. Y.

Open Hearth Furnaces—Photo Courtesy
Jones & Laughlin Steel Corp.

Continuous Heating Furnaces—
Photo Courtesy Crucible Steel Co.

Soaking Pit—Photo Courtesy
United States Steel Corp.



Heat Treating Furnace—
Photo Courtesy Taylor Forge & Pipe Works

Increase Production . . . Lower Production Costs with

LOFTUS Industrial FURNACES

For years Loftus Industrial Furnaces have been providing dependable, economical service to the steel industry. Their long life and efficient performance have been proved by time. The fact that they materially contribute to lower-cost operation and increased production is a matter of record.

Whatever your heating or heat-treating requirements, it will pay you to take advantage of Loftus' long experience in furnace design and construction. Many of the world's leading companies have—and to their utmost satisfaction, as proved by the high percentage of repeat orders we get.

We would welcome an opportunity to quote on your requirements.

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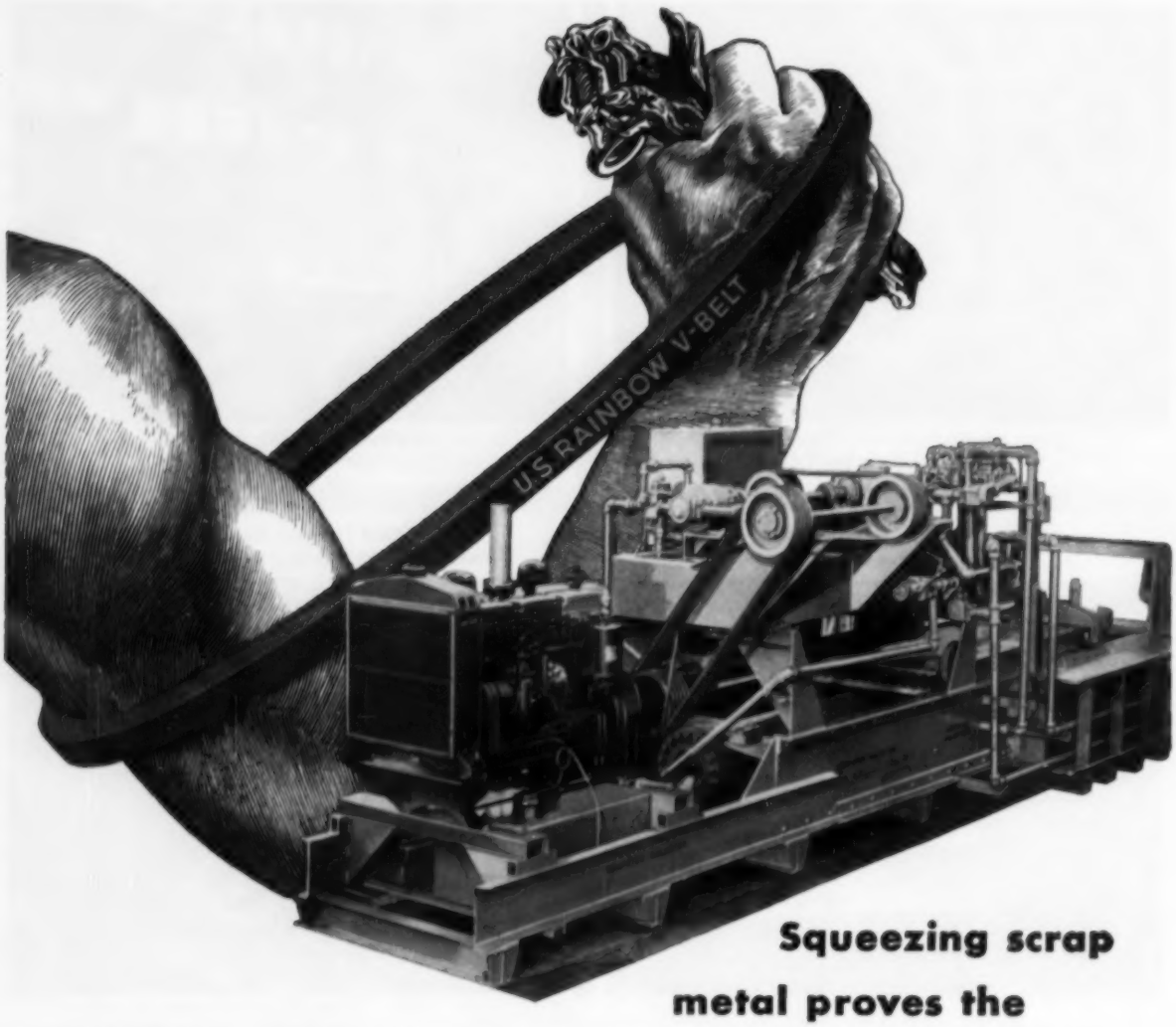

Squeezing scrap metal proves the "MUSCLE TOUGHNESS" OF U. S. RAINBOW V-BELTS

Many scrap metal dealers use the Dempster-Balester to bale sheet metal into easy-to-handle units. The tremendous power of the machine puts terrific shock loads on V-Belts —U. S. Rainbow® V-Belts. These muscular belts stand up under this treatment because they each have the unique Equa-Tensil Cord Section, a scientifically developed "U. S." construction that brings together in a balanced unit the concentrated strength of multiple pulling cords, distributes the load so evenly among the cords that each carries its full share of the load.

U. S. Rainbow V-Belts have greater gripping power, without slippage, because the straight sidewalls grip the grooves the full height of the belt. Every ounce of excess stretch is worked out mechanically before leaving the factory, yet the belt remains elastic enough to stand heavy shock loads.

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Mechanical Goods Division

United States Rubber

Technical Outlook

MORE EXTRUSIONS—To meet an unprecedented demand for large, high strength aluminum extrusions (chiefly for aircraft and missiles) Alcoa reports it is installing another 14,000 ton extrusion press at its Lafayette (Ind.) works. Financed with company money (the other one is owned by USAF), it will be in operation early in 1959. Ribbed wing sections, wing spars, rotor blades for big helicopters and structural shapes up to 110 ft long (weighing as much as 2500 lb) will be made.

MORE KILOWATTS—Requirement for more production and the trend toward automation will increase the need for improved and expanded electric systems in the steel industry, according to a report given by General Electric Co. at the Pacific coast meeting of AIEE. One of the largest consumers of electricity, the steel industry last year used 27 billion kilowatt-hours—230 kw-hr per ingot ton of production.

WRINKLE PLASTISOL—This wrinkle finish is virtually 100 per cent solids. Eight to 10 mils thick, it is sprayed on. First use is expected to be on typewriters, business machines and other office equipment. Stanley Chemical Co., East Berlin, Conn., the developer, says the finish has superior hardness and good resistance to perspiration and abrasion. It's available in a few basic colors. A full line is being developed.

BETTER MAGNETS—A manganese - bismuth compound made from highly purified powders is the basis of a new permanent magnet material announced by Westinghouse. So promising are its properties that Dr. Clarence Zener, acting director of research, predicts: "It will affect the future design, construction and performance of many devices which use permanent magnets." One big advantage of Mn-Bi magnets is their unusual resistance to demagnetization—they're ten times better in most cases. Another: Ease of forming—they can be cast or molded, possibly extruded.

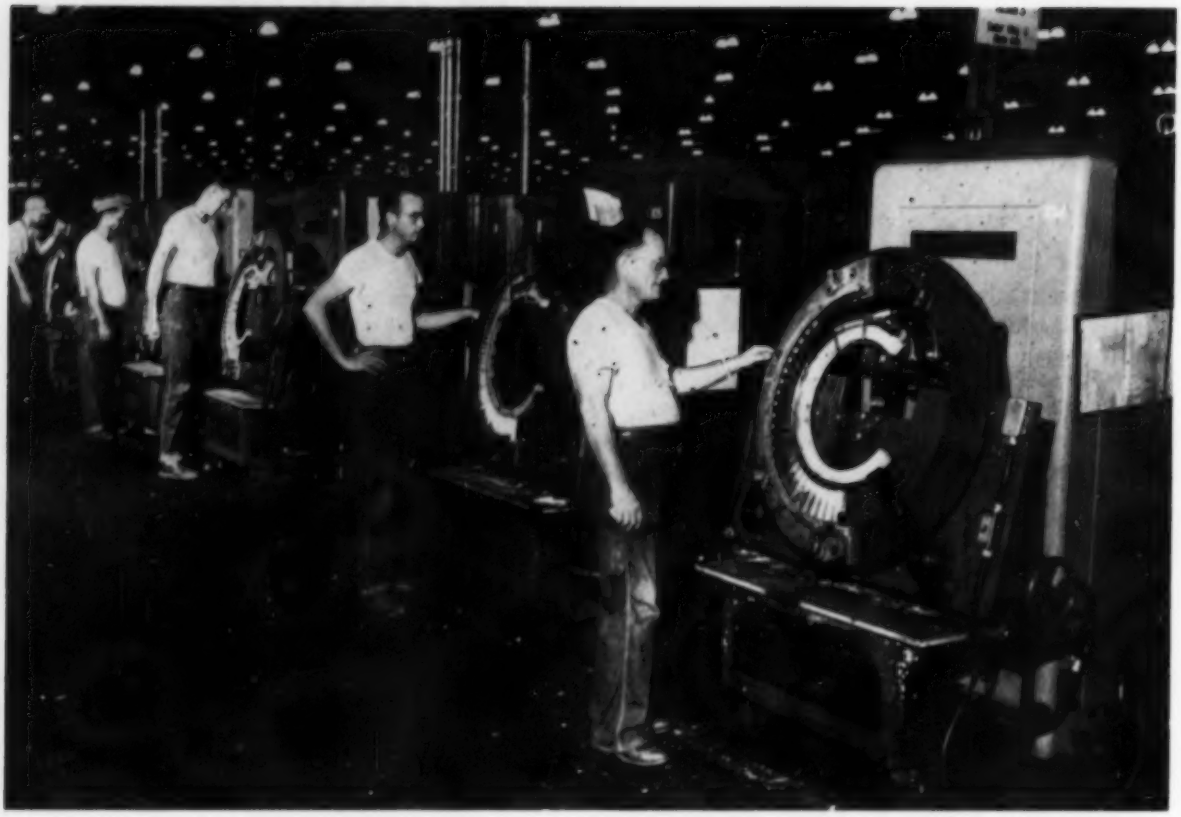
ENGLISH AUTOMATION—At the forthcoming International Machine Tool Exhibition in London, English builders will put automation at center stage. New developments include a tape-controlled milling machine, an automatic-cycle gear grinding machine, an automatic marking machine and a continuous ultrasonic degreasing setup.

POLKA DOT PAINT—Striped paint may be a practical joke, but two-color speckled paint is serious business. The maker likens the pigment particles to pollywogs, with nonpolar pigment heads that repel, and resin tails that attract each other. Anyway, it works. A spots-before-your-eyes finish costs about the same as solid tone.

DRILLERS' AID—The rapid pullout attachment for Brown & Sharpe's new 00 automatic screw machine is so popular that company officials report it's being asked for on about 80 per cent of the machines sold. The attachment rapidly withdraws a drill automatically to clear chips, then puts the drill back into the hole to continue operations.

CURTAIN RAISER—The iron curtain of language is about to be nibbled away by machine. International Telemeter Corp. has signed a contract to develop a machine to translate technical Russian into English. Heart of the electronic translator is a new type photoscopic information storage unit.

Metalworking Outlook—p. 41 *Market Outlook—p. 115*



Induction machines at Allis-Chalmers Mfg. Co. silver braze 28 jet blades to engine shroud rings in 10 minutes. The circular fixture rotates slowly on the rollers at bottom, moving the blades in the stationary heating coil

Brazing with Silver Alloys

SILVER BRAZING is one of the fastest growing methods of joining. The number of fabricated metal products being assembled with this technique has more than quintupled during the last decade.

A 1954 survey by Handy & Harman, New York, showed 76 automotive parts were being silver brazed, compared with 57 in 1949. At least 242 joints were involved.

The survey found 35 aviation parts and assemblies being brazed with silver alloys. Hundreds of joints were involved. An average turbojet engine, the report states, has about 3500 silver-brazed joints.

Other Uses—Other large volume users of this joining technique are the air conditioning, refrigeration, appliance, toy, power tool, instrument and commercial plumbing industries.

Factors contributing to the growth of silver brazing are its versatility, speed and adaptability to mass production methods. Silver alloy filler metals can be used to braze all ferrous and nonferrous metals except aluminum, magnesium and other materials which have a low melting temperature.

Alloys — Major constituents of most silver brazing alloys are silver, copper and zinc; some contain cadmium, nickel or tin. Color of the alloys after brazing ranges from white to light yellow.

The table on page 81 lists the standard alloys, together with the more special metals. For instance, the silver-copper-tin alloy listed is used mainly where a fabricator wishes to avoid zinc and cadmium, as in vacuum tube parts.

Eutectic—Another alloy in the same category is BAg-8, the silver-copper eutectic which is used in large quantities by the electronic industry. A slight variation of this alloy contains 0.5 per cent nickel; some feel this is helpful in brazing ferrous metals.

The silver-copper-manganese-tin alloy is used to join the chromium carbides to both ferrous and nonferrous metals. It has high corrosion resistance where the user wishes to avoid zinc or cadmium.

The AMS 4772A is excellent for leakproof joints, and has good strength at elevated temperatures. This is called a high-temperature

brazing alloy, since its flow point of 1575°F limits its use on many of the brasses.

Copper Joining—BCuP-5, which contains 15 per cent silver, is the well-known government specification Grade III alloy. It is used mainly for joining copper to copper, or to the various brasses.

The two newer alloys, BCuP-3 and BCuP-4, are near relatives of this silver alloy. They are not so ductile as their 15 per cent silver cousin, but they offer economic advantages where ductility is not important. Most of these alloys can be used at 1300°F or slightly higher.

Forms—Nearly all the silver alloys are made in four standard forms—wire, rod, strip and powder. Handy & Harman has come up with a fifth—expanded and rolled strip. Its principal advantage is weight reduction.

An expanded strip may weigh less than one-third as much as solid strip of the same cross-section thickness. To match the weight of 0.003-in. expanded strip, a solid strip would have to be under 0.001-in., which is seldom practical because such thin foils are too fragile to handle conveniently.

Strengths—Automatic and semiautomatic setups offer economies in joining by reducing brazing time per piece, while maintaining a high standard of joint quality and uniformity. Although joint strength is largely affected by the design of the joint and the strength of the parent metals, typical production joints will range from 30,000 to 60,000 psi.

Allis-Chalmers Mfg. Co., Terre Haute, Ind., has cut the time needed to silver braze jet blades to engine shroud rings 50 per cent by the use of automatic equipment.

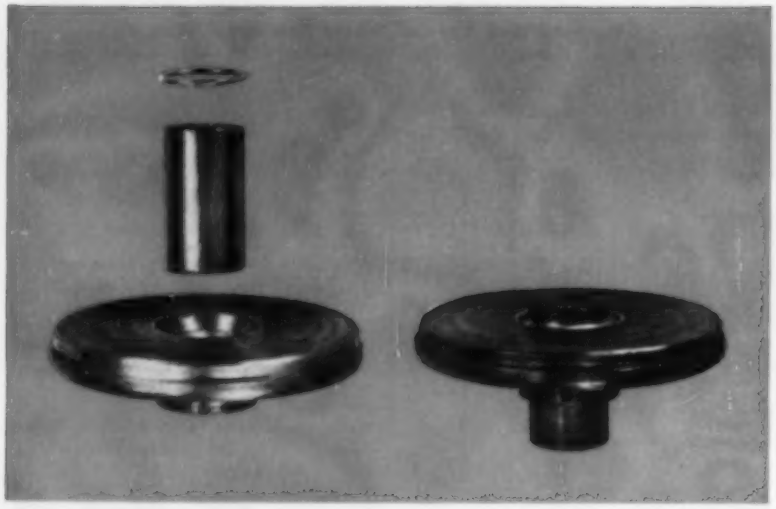
The Job—Inner ends of 28 nickel-steel blades are brazed to semicircular brass shroud rings which form the stator blades of the Curtiss-Wright J65 turbojet engine. The company formerly used hand torches to braze them.

The induction heating units shown on page 80 braze the 28 joints in about 10 minutes. After the parts are assembled, fluxed, preformed filler metal put in place and the assembly mounted in its fixture on the machine, operation is automatic.

Semiautomatic—A 3¼-in., cold-

Standard and Special Silver Brazing Alloys

AWS-ASTM Classification	Composition (%) Ag	Cu	Zn	Others	Brazing Temp (°F)	Properties and Uses
BAg-1	45	15	16	Cd 24	1145-1400	Free flowing, low melting. General purpose work
BAg-1a	50	15.5	16.5	Cd 18	1175-1400	Same as for BAg-1
BAg-2	35	26	21	Cd 18	1295-1550	Free flowing. General purpose work at slightly higher temperatures
BAg-3	50	15.5	15.5	Cd 16, Ni 3	1270-1500	Brazing carbide tool tips. Good for bridging gaps or forming fillets
BAg-4	40	30	28	Ni 2	1435-1650	Uses same as BAg-3, but higher temperatures required
BAg-5	45	30	25		1370-1550	General purpose alloy. May be used where cadmium-containing alloys are prohibited, as for food handling equipment
BAg-6	50	34	16		1425-1600	Same as for BAg-5
BAg-7	56	22	17	Sn 5	1205-1400	General purpose, low melting. Good for furnace brazing. Less prone to cause stress corrosion cracking on stainless steels and some nickel alloys
BAg-8	72	28			1435-1650	Brazing vacuum tubes. Free flowing, but does not wet well on ferrous metals. Widely used for electronic parts
BAg-9	65	20	15		1325-1550	Used for joining sterling silver
BAg-10	70	20	10		1390-1600	Same as for BAg-9
BAg-11	75	22	3		1450-1650	Same as for BAg-9
BCuP-3	5	89		P 6	1300-1550	Joining copper and copper alloys. Not as ductile as BCuP-5
BCuP-4	6	87		P 7	1300-1500	Same as for BCuP-3
BCuP-5	15	80		P5	1300-1500	Refrigeration, air conditioning, electrical, plumbing and heating equipment
Silver, Copper Tin	60	30		Sn 10	1325-1500	Used where zinc and cadmium must be avoided, as in vacuum tube parts
Silver, Copper, Manganese, Tin	57.3	32.7		Sn 7, Mn 3	1345-1600	Brazing chromium carbides to ferrous and nonferrous metals
Silver, Copper, Tin, Nickel	63	28.5		Sn 6, Ni 2.5	1475-1700	Brazing straight chromium stainless steels where assemblies will be subject to humid atmospheres
AMS 4772A	54	40		Zn 5, Ni 1	1575-1700	High temperature alloy. Good strength at elevated temperatures. Jet engine assemblies
BAgMn	85			Mn 15	1780-2100	Brazing stainless steel and high nickel alloys



This disc and hub are induction brazed in 45 seconds on the simple fixture shown below. Heating from the top only prevents the filler metal from penetrating to the lower face of the joint and forming a fillet which might interfere with the fit of a bearing that will be mounted against the shoulder

rolled disc and hub, being brazed by Allied Soldering & Brazing Co., Rochester, N. Y., could be machined from solid stock. It is far more economical to machine the two parts separately and braze them.

Parts are assembled and fluxed on a simple jig consisting of four leveling posts (see photo on this page). Then 1/16-in. rings of silver brazing alloy are placed in the groove.

Operation—To braze the assembly, the operator steps on a foot pedal which raises the assembly into an induction heating coil. In 45 seconds, the joint is completed.

Note that the joint is heated only from the top. This is to avoid having the silver alloy penetrate to the lower face of the joint and form a fillet. This might interfere with the fit of a bearing that later is mounted on the shaft against the shoulder of the disc.

Problems—Some of the nonferrous base metals have been found difficult to braze. These are the aluminum brasses and bronzes, the beryllium-copper alloys, K-Monel, copper-nickel alloys, the leaded brasses and the silicon bronzes. Here are tips from A. W. Swift of Handy & Harman's engineering division on how to overcome these problems.

The aluminum bronzes can be brazed by using a special flux, as long as the aluminum content of the alloys is not above 8 per cent. If you have had trouble brazing a manganese bronze, check its analysis. You may find it contains as much as 2 per cent aluminum.

When the special flux is used, the brazing of the aluminum content brasses and bronzes is not too difficult. Brazing alloys such as BAg-1, BAg-1a and BAg-2 are most commonly used.

To Steel—In brazing aluminum bronze to steel, it has been found that the BAg-3 alloy, containing 3 per cent nickel, helps to counteract the aluminum oxide contamination. The special flux should always be used.

With careful procedure, such as lengthy overheating, the aluminum bronzes also can be brazed to the stainless steels. Again, the BAg-3 alloy is best. An alternative method is to use the BAg-3 alloy clad on both sides of a thin copper sheet. This prevents the diffusion

of the aluminum through the brazing alloy and onto the steel.

K-Monel contains 2¾-per cent aluminum. Again, the special flux for aluminum bronze will help you get consistently good joints.

Beryllium Copper—Silver brazing of the beryllium coppers is not difficult if the low temperature alloys are used. Flux with the standard silver brazing flux.

The solution to successful brazing of these alloys is to clean off the oxide, flux quickly and braze—all in a matter of seconds. If this cannot be done, due to batch pickling or similar reasons, give the parts a copper flash right after pickling; then you can flux and braze somewhat at your leisure.

In brazing beryllium copper to steel, the 3 per cent nickel alloy, BAg-3, is advantageous.

Copper-Nickels—In brazing copper-nickel alloys, you can best avoid stress corrosion cracking by stress relieving before brazing and using a low temperature alloy. Do not use any of the phosphorous content alloys; the phosphorous will form brittle nickel phosphides.

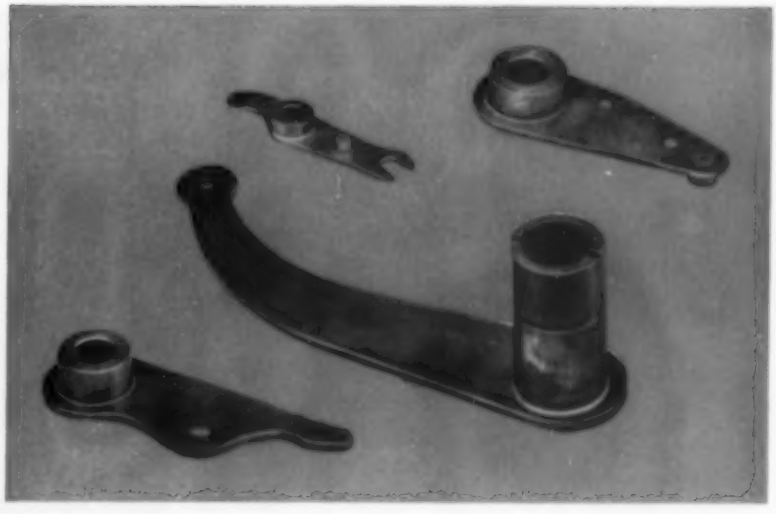
Leaded brasses may be brazed successfully, after the usual care in cleaning and fluxing, by rapid heating of the joint area to just above the flow point of the brazing alloy. Both low temperature and copper-phosphorous alloys are used. The 85-5-5-5 brass alloy has been silver brazed for many years.

Some of the higher lead content alloys cause trouble when the lead bubbles out during heating. If lead bubbles out when you are using the lower content alloys, it is a sign that your heating operation is too slow.

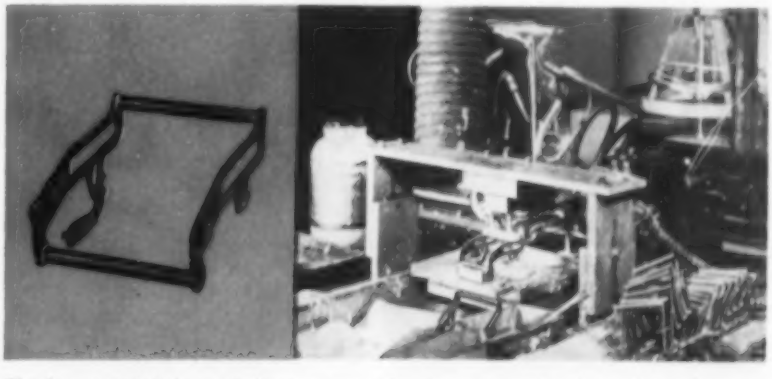
Silicon Bronze—Before brazing the silicon bronzes, you must mechanically remove the slight silicon glaze. The BAg-1 and BAg-1a alloys are recommended because their flow points are under 1200°F. Some of the silicon content alloys are hot short in the 1300 to 1400°F range.

Parts II and III of this article, to appear July 2 and 9, will cover fluxing and application techniques.

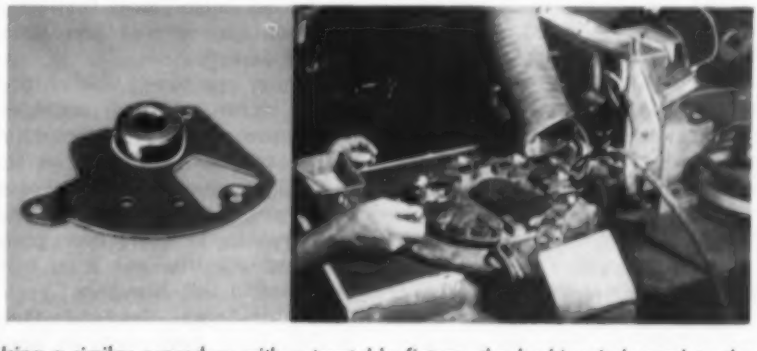
• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



Five years ago, Victor Adding Machine Co., Chicago, started designing parts for silver brazed assembly. Today, it makes a number of parts that way. Some of these are shown above and below. Fast handling and heating setups make the job easy and reduce brazing time

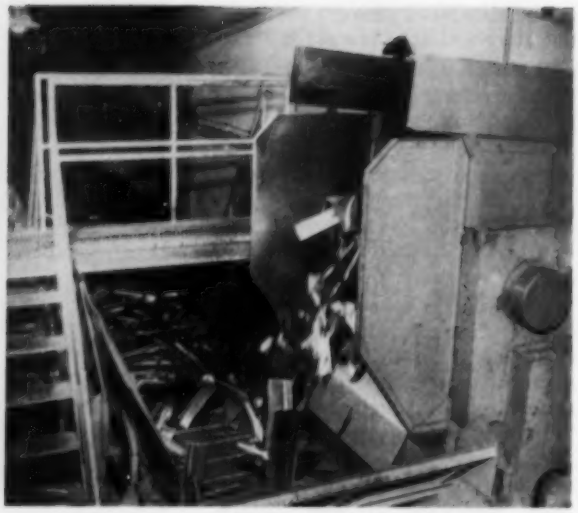


The frame at left is made by brazing side pieces to rods. A number of assemblies are brazed on one end, then on the other. The operator dips the end of the assembly in flux, puts it in a fixture and steps on a foot switch. Three things happen automatically: The assembly is positioned in an induction heating coil; alloy wire from reels in back is fed into place over the junction of the rod and side frames; the coil is energized. Five seconds later, the two joints are made. Production is 120 frames—480 joints—an hour



Using a similar procedure with a turntable fixture, the bushing is brazed to the case-hardened stamping of the assembly shown at left, in 3½-seconds—500 an hour

Scrap from stamping presses falls through a chute in the floor to collector conveyors below



From a central conveyor, running the length of the plant, it drops to an inclined conveyor that carries it to a hopper

Scrap Conveyors Clear the Aisles

STAMPING plant No. 1 at Fisher Body Corp., Flint, Mich., turns out almost 75 per cent of the body stampings for Cadillacs and Buicks (Supers and Roadmasters). Disposing of sheet metal scrap was a big headache before a scrap conveyor line and automatic baler were installed.

Gondola scrap cars were stationed near each machine, loaded by hand and trucked off to the baler site for dumping.

Problems—Harry A. Koester, plant superintendent, points out: "This method not only was time consuming, but it was a definite safety hazard. Our aisles always were cluttered and men were either getting cut by dangling pieces of scrap, or they were getting hit by gondolas."

In the spring of 1955, engineers began installing the new conveyor system. "The biggest problem we faced was putting the system into a plant which wasn't designed for it," says Robert Brooks, process engineer, who followed the operation from start to finish.

Close Fit—A lot of shuffling had to be done to get clearance for the conveyors which run under the floor. Many feeder lines bend and twist around machine supports. Plenty of fitting was needed to make sure the scrap wouldn't pile up and jam going around corners.

Another problem was fitting scrap chutes at each machine. Older presses are supported at front and rear instead of on the sides. This meant that the chutes, which are as wide as the machine bed, had to be built over press supports. All this was done with the plant in full operation.

Smaller Scrap—Meanwhile, tool modifications were made on some presses, so scrap could be cut into smaller pieces. An addition was built to house the Lindemann baler. In September, 1955, the system went into operation. Here's how it works:

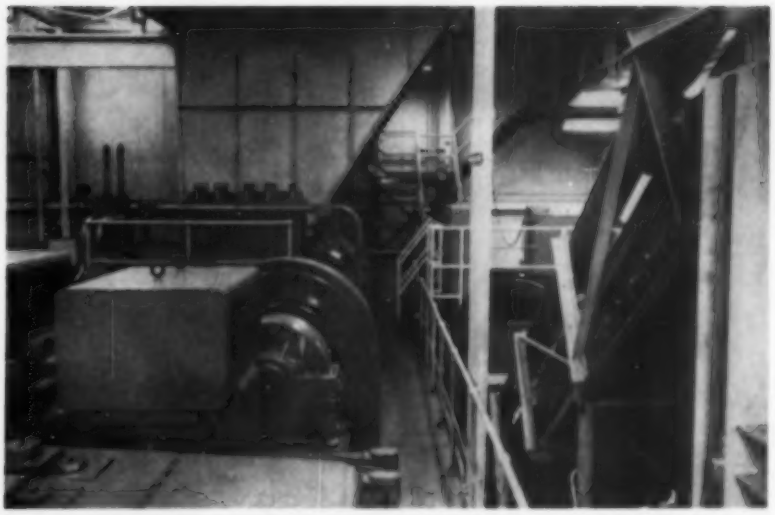
1. Each press has its own chute set flush with the press bed. Scrap is kicked out of the press automatically and drops down the chute onto collecting conveyors.

2. The collector lines carry scrap to a central conveyor which runs the length of the plant. Sides of the conveyors are built up with sheet metal to keep the scrap from jumping out.

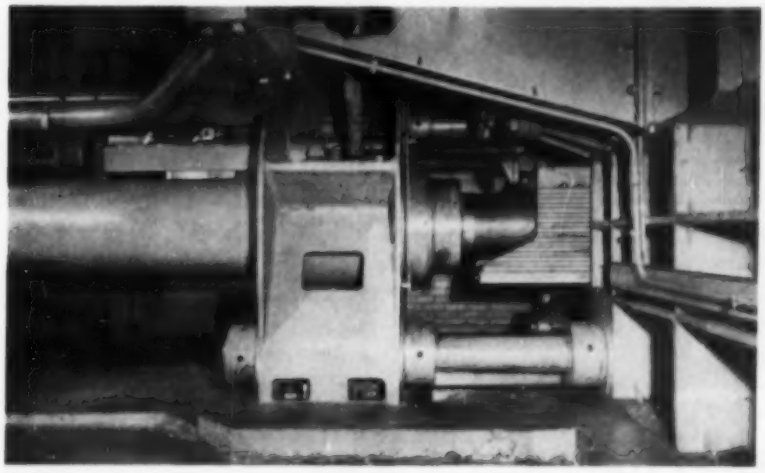
3. At one end of this line, scrap falls into a crossconveyor which carries it up an incline where it drops into a hopper above the baler.

4. As the baler fills, a low-pressure hydraulic ram (700 to 800 lb) pushes the scrap into one end. Ram blades cut off excess scrap; the ram head also acts as a cover plate. A high-pressure ram (up to

The bottom of the hopper has a glass viewing panel, so the baler operator can see how the scrap piles up



Baler room with hopper in rear. At right is the conveyor line which drops bales into railroad gondola cars. Top of baler is in foreground. Walls of the baler room are lined with acoustical panels to deaden sound



Here is the high pressure ram of the baler just before it moves forward to give a bale its final squeeze

Bales shoot down the end of the final conveyor into waiting gondola cars

4000 lb) comes in from the side to give a final squeeze to the bale.

5. Finished bales are kicked out onto a conveyor by a final push of the high-pressure ram head. They fall into railroad gondolas, spotted automatically by an operator inside the baler house.

Emergency Conveyor—Bales are 24 in. high, 18 in. wide and 20 to 36 in. long. They weigh 750 to 1400 lb, although 800 lb is standard. If the baler should break down, an emergency conveyor catches the loose scrap as it falls from the hopper and dumps it directly into the railroad cars.

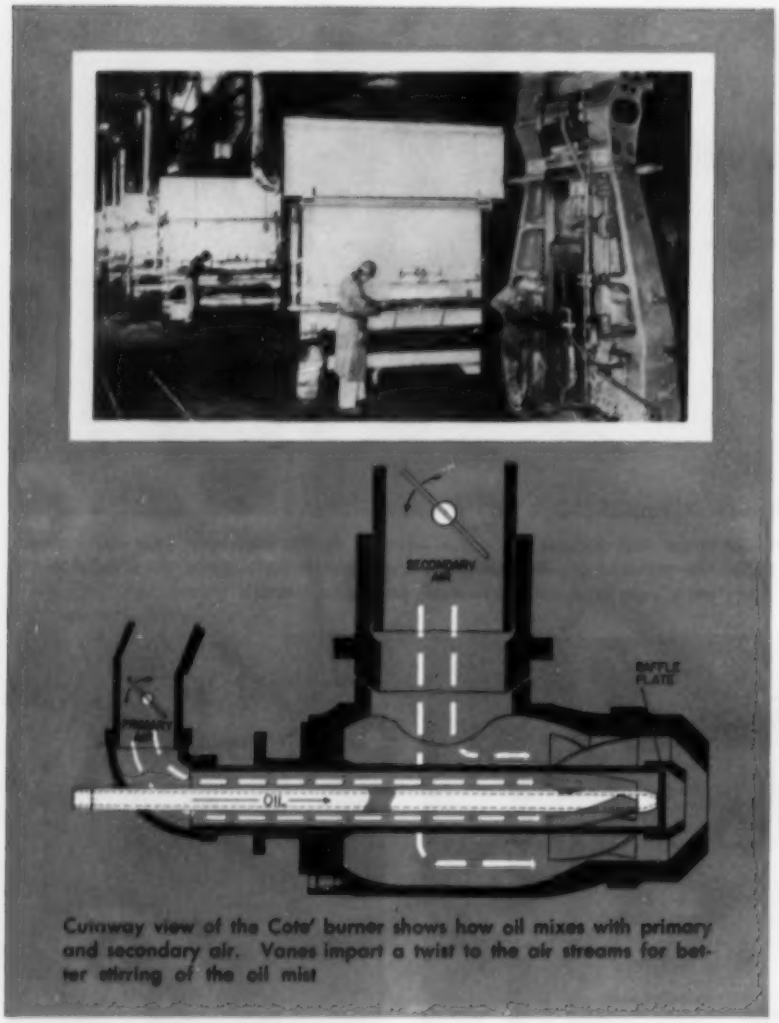
Mr. Brooks says the system is operating at 90 per cent of capacity. About 200 tons of scrap (40 bales an hour) are loaded into four railroad cars in an average 8-hour shift.

Baler Capacity—The baler itself has a rated capacity of 75 bales an hour. It's expected that full capacity will be reached in May, when another line of presses is installed. A second baler can be added if necessary, but Fisher people feel that won't be for some time.

"One big advantage of the Lindemann baler is that it will handle all our scrap without having to weigh or measure it," claims Mr. Brooks. "It rests directly on the floor. Being hopper fed, no pit is necessary."

Advantages—He adds that the old baler still is used to handle rejects, such as doors or quarter panels, which are too bulky to fit on conveyors.

As Mr. Koester sums it up: "Our new system is more efficient because it gives us more floor area, steps up production capacity and is a lot safer. Workers have an easier job, and housekeeping is simplified."



Cutaway view of the Cote' burner shows how oil mixes with primary and secondary air. Vanes impart a twist to the air streams for better stirring of the oil mist

Furnaces Whip Scale Problem

Engineers at this Michigan forging plant report furnaces they designed and unique burners are licking scale problem. Another plus: Low cost of operation

IF THERE'S one problem that bothers everyone in the forging business, it is scale on stock.

Scale cuts die life by as much as 50 per cent. It makes accurate size and weight control on the forging almost impossible and can cause excessive cost in the machine shop.

Attacking the scale problem at its source, engineers at Webb Forging Co., Belleville, Mich., built six new oil-fired forging furnaces. Three are 42 cu ft models, three are 36 cu ft.

Burners—Coupling furnace design with a new adjustable-gun-type burner is the key to success. Burners, developed by W. Cote, are being made by Webb for installation in other forging plants.

The burners are mounted on each end of the furnace. They're about 5 in. off center and are diagonally opposite each other about 24 in. above the furnace floor. Burners are aimed slightly upward and toward the near wall. The flame pattern arcs across the furnace, off the far end and down across the floor. This even flame cover of the floor gets much of the credit for elimination of scale on the stock.

Double-Barreled—Oil is supplied to the burners by a dual recirculating pump and filter circuit with 50 psi pressure at the outlet. Oil, issued by a needle-type valve, feeds through the centers of the burners.

Concentric with the oil tube in the burner, primary and secondary air bodies supply the pressurized air. Oil is forced through the valve against a radially slotted baffle plate. Here the mist is picked up and driven into the furnace by primary air. The air passes vanes and hits the mist twisting counterclockwise. Secondary air, also twisting counterclockwise, supplies the oxygen atmosphere for the furnace.

The operator has control of the oil and secondary air from the furnace front, giving him complete control of the flame pattern.

Gains—After more than a year's operation on the furnace line, Webb engineers cite their biggest gains:

- Versatility: Simple adjustment of the burners makes it easy to compensate for different furnace and flame conditions.
- Economy: New equipment has cut fuel consumption by 20 per cent.
- Speed: Furnaces will heat to forge temperature within a half hour.
- Maintenance: Simplicity of burners makes it possible to tear one down in 15 minutes. (In more than a year's operation, no maintenance on the burners has been required.)
- No Scale: Elimination of scale on the heated stock is attributed to the even flame pattern over the furnace floor and an air curtain at the hearth that keeps room air out. Scale now forming on the steel (when stock is moved from the hearth to the hammer) knocks off easily.

Furnaces—Floors, walls and bottoms of the furnaces are lined with one course of insulating brick and two courses of fire brick. The roof and front walls are fire brick with sprung-arch construction.

Each furnace is hooded and vented by a stack which is 24 in. in diameter. Furnaces are mounted on heavy-duty coil springs. They isolate shock and vibration from the forging hammers, prevent the insulating brick from breaking.

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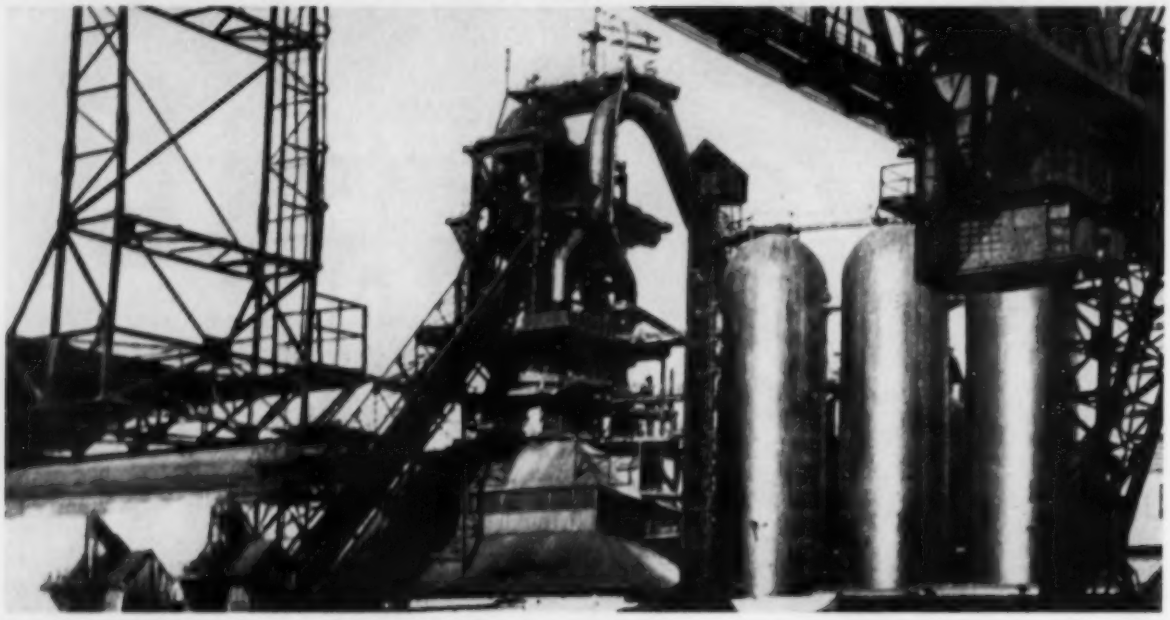


No. 5 blast furnace at Zaporojstal in the Ukraine

Steel Behind the Iron Curtain

RUSSIAN steelmaking faces a tremendous task. Its steel production goal for 1960 is 75 million tons, a 34 per cent jump in five years from the 50 million ton 1955 level.

A British delegation of steelmen has returned from the USSR with a better understanding of how the Russians hope to accomplish their goal. Here, from the official report, are some of the things they saw:

Long Term — Among general objectives of current planning is the building up of regional industries using local raw materials, even though these may have a more limited life, or may be lower in quality than the major raw material deposits of the country. This policy is associated with increased emphasis on avoidance of long rail hauls. Another objective is building up output of flat product to 45 per cent of total iron and steel production. The goal for tubes is 13 per cent.

Amortization (over a 25-year span) is included in the costs of production. The amortization fund remains with the works. Further sums for expansion are drawn from the government. The greater part of capital sums required for development is available from the depreciation funds or surpluses arising within the steel industry itself.

Coal and Coke—Bulk supplies of raw materials from specified concerns are allocated to the works to meet planned production. The plant director orders the material (both quantity and quality) he requires. Works are given instructions on deliveries by the Ministry of Iron & Steel. Prices are fixed for all the commodities purchased by the works.

One of the major problems facing the Russian iron and steel industry is the high ash (up to 18 per cent) and sulphur content (up to 1.8 per cent) in coke. Coal blending is extensive. A substantial increase in coking coal supplies (some 30 million tons, or approximately 60 per cent of present requirements) will be required if planned iron production of 58 million tons is to be achieved in 1960.

Coke oven operation features high standards of cleanliness and operating efficiency. The oven doors (at the Rustavi steelworks in Georgia) appeared to be in excellent condition, and there were no visible leaks. There is no smoke during charging, due to the suction induced by steam jets. The complete absence of smoke is probably explained by the low pressure in the collecting main, which is 1.5 to 2.5 mm water, compared with 3 to 5 mm for British practice. The ovens are run on the main up to the time they are pushed.

Iron Ore — The 165-million-ton output of iron ore planned for 1960 (some sources indicate that production may be as high as 182 million tons) includes an unspecified quantity for export. It appears that ore production is to be about doubled, although the planned increase in iron production is about 60 per cent.

Five ore preparation and concentration plants, each designed to treat 5 million tons of ore a year initially (and, ultimately, 10 million tons), are under construction or planned for the concentration of the low-grade ore. This suggests that a large proportion of the increased ore production for ironmaking will be of low grade and will be concentrated.

Beneficiation — The Ugok concentrating and sintering plant near Krivoi Rog (in the Ukraine) is the

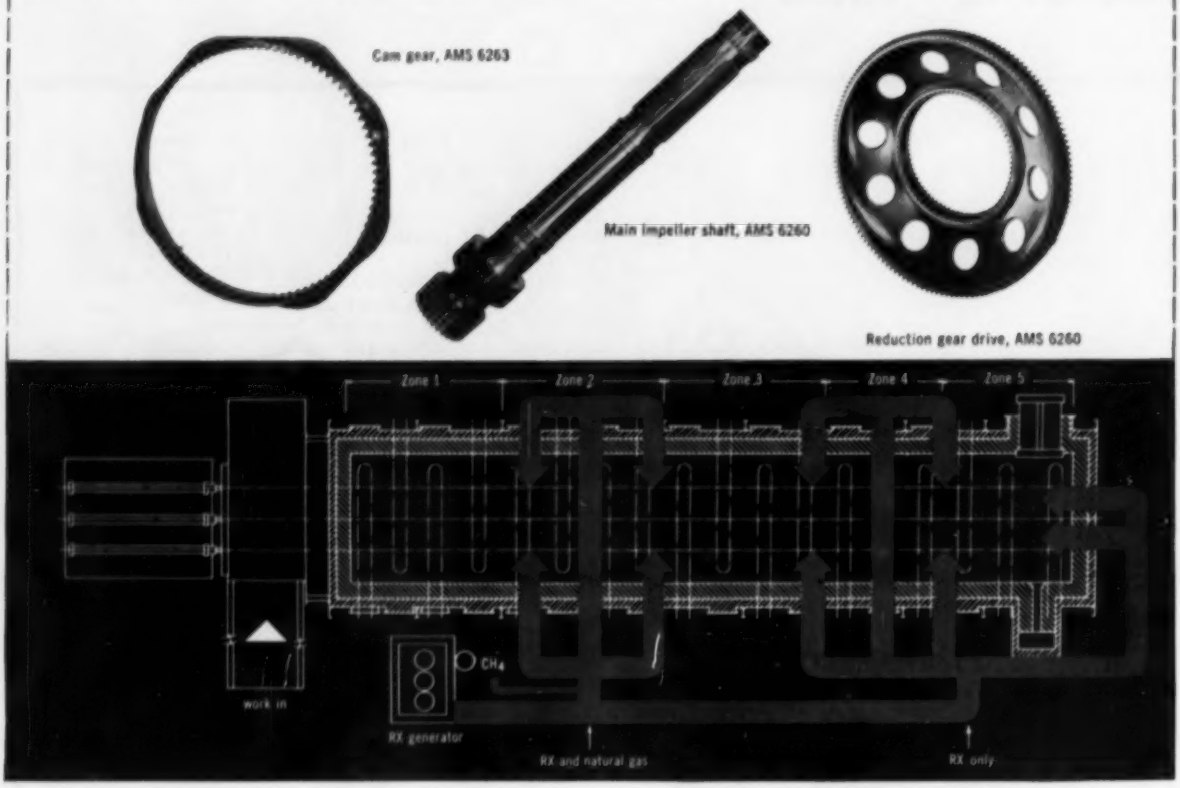
(*Please turn to page* 91)

HE HOLDS ME UP FOR 10 MINUTES WHILE HE COLLECTS JUNK AND THEN JUMPS ALL OVER ME BECAUSE I DON'T CHARGE FAST ENOUGH.
HE KEEPS LEAVING THEM BEER SIGNS IN THE MELTER'S SHANTY IN THE HOPE THE OLD MAN WILL GET THE IDEA AND BUY ONE.
REMEMBER THE NIGHT HE DUG THE ROLLER SKATES OUT -- AND ENDED UP FALLING IN THE BOSH.
DRINK
BEER
HEKES

The Buzzard

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



Surface split manifold arrangement which permits controlled variation of carbon potential in different zones of a continuous furnace, using a single RX® generator

'Surface' carburizing holds aircraft tolerances

When your heat treating and inspection standards are tightened to "aircraft quality," it's time to specify 'Surface' precision gas carburizing. It will give you close tolerances and bonus benefits as well—as the manufacturer of these aircraft gears discovered.

A 'Surface' continuous gas-fired furnace, with controlled atmosphere, delivers accurate metallurgical results on every part, the first time. In addition, the furnace can simultaneously process different steel analyses with different case depths. The operator simply varies the automatic cycle intervals on three rows of work trays. Furnace mechanization minimizes operator attention and parts handling—assures that each piece receives the prescribed time-temperature cycle.

Ideal case carbon gradients are achieved by the unique split manifold distribution of atmosphere from a single RX gas generator—a typical example of 'Surface' know-how working for the user.

SEND FOR BULLETIN SC-172 • SURFACE COMBUSTION CORPORATION • 2385 DORR ST., TOLEDO 1, OHIO

Surface® Heat Treat, Steel Mill, Glass Divisions • Kathabar® Air Conditioning Division
Janitrol® Heating and Air Conditioning Division • Janitrol® Aircraft-Automotive Division

Surface
HEAT TREATING EQUIPMENT

first of five large plants which are to be completed in the next few years for beneficiating ore to an iron content of about 60 per cent. It will sinter ore concentrate with sea shells from Balaclava to produce a completely self-fluxing sinter for shipment to ironmaking plants in the area. The sintering plant, which is on the point of being commissioned, has five stranda, each with a sintering area of 805 sq ft.

The standard sinter strand is the German type, Dwight Lloyd machine of orthodox construction, with 2-rolled feed and a sintering area of 805 sq ft. Rated strand outputs vary from 1400 to 2000 tons per day, depending on the nature of the ore, or concentrate being sintered. There appear to be no special arrangements for cooling the sinter. An extended hood runs back over the strand from the discharge end, and air from combustion is sucked down the discharge chimney and through the bed.

Scrap—The ratio of pig iron to steel production in Russia is higher than it is in Britain. In 1955, Russian pig iron production was 73 per cent of crude steel production, and it is planned to increase this ratio to 78 per cent by 1960. It is not clear what proportion of the iron production is used for castings, but the high ratio must be partly due to the rapid expansion of the steel industry and the difficulty of collecting scrap over wide areas.

At about one-third of the price of finished steel, the price of scrap would be relatively higher than it is in Britain and more comparable to the ratio on the Continent.

Iron—Great importance appears to be attached to obtaining maximum production from existing blast furnaces. Of the two blast furnace plants visited, the one at Zaporojstal (in the Ukraine) was the more interesting. Rustavi is a new works in an area where there has been no steel industry, and production has not been built up to the high standard of efficiency as Zaporojstal.

At Zaporojstal, there are five blast furnaces. Two have hearth diameters of 23 ft and the remainder have 26-ft hearths. All five work on high-top pressure, blowing at about 27 psi at the bottom and about 5 psi at the top. On all furnaces, the humidity of the blast is automatically controlled at 8.8 grains per cu ft by steam injection. About 80 per cent sinter is being used in the burden, but it is planned to raise this to 100 per cent.

Furnace outputs range from 1300 to 1900 tons per day. The average coke consumption is about 0.87-ton per ton of iron, with a burden which averages about 41 per cent iron. Furnaces are driven hard, and on one furnace, the blowing rate was 100,000 cu ft per minute.

Top Pressure—At Rustavi, there are two furnaces of 19¾-ft hearth diameter. High-top pressure operation is to be introduced shortly. Coke consumption averages about 0.9-ton per ton of iron, with a charge containing about 50 per cent iron. The rate of blowing is high on these furnaces also—about 50,000 cfm. Each furnace has been producing about 940 tons of iron a day.

The high productivity of Zaporojstal cannot be wholly explained by the quality of raw materials. The emphasis on ore preparation and sintering, the high rate of blowing, the use of high-top pressure and controlled humidity of the blast must make a substantial contribution toward excellent results obtained.

None of the blast furnaces at Zaporojstal has been relined since the plant was brought back into commission after the war. One furnace had operated for nine years without relining and is expected to complete a furnace campaign of 5½ to 6½-million tons, compared with a national average of 1½ to 2 million tons. These long campaigns are all the more surprising in view of the high rate of driving of the furnaces.

Soviet Goals*
(millions of tons)

	1933	1960
Coal	430	654
Iron ore	83	165
Pig iron	36	58
Steel	50	75

*Converted to 2000 lb tons

Design—A distinctive feature of the blast furnace design is the use of cast stave coolers from the mantel plate to the bottom of the hearth. The internal faces of the coolers are serrated slightly to provide effective contact between the brickwork and the staves. There seems no doubt that this contributes to long furnace life.

No low shaft or electric blast furnaces are operating in Russia, although the erection of a small electric blast furnace plant for the study of the economics of the process is planned.

Blast furnaces and open-hearth furnaces are fully instrumented, and high-top pressure instrumentation is most elaborate. Continuous gas sampling probes are fitted near the top of each of the blast furnaces. The doors of the open-hearth furnaces are electrically controlled and immersion pyrometers are in regular use. Radioactive isotope thickness gages are fitted to all the finishing stands on the hot-strip mill and to the cold-reduction mills.

Steel Production — The melting shop at Zaporojstal is an American-style plant. It has ten, stationary, 200-ton, basic open hearths in line. The two mixers are in a separate building, and hot metal is brought to the shop on a rail track which runs along the back of the large nonslewing chargers.

The furnaces are fired with mixed blast furnace and coke oven gas and are well instrumented. The chrome-magnesite roofs have no

(*Please turn to page* 92)

sprung skewbacks or suspension but have a high rise.

Oxygen—The main use of oxygen is for combustion. It is introduced into the air stream to raise the oxygen content to 25 per cent. This has reduced average melting time from 9.8 to 8 hours. The average life of chrome-magnesite roofs has increased from 417, without oxygen, to 427 heats with oxygen-enriched air.

One furnace is equipped with oxygen-steam lances inserted through the roof, one at each end of the furnace. The use of steam reduces the brown fume.

Productivity — Heats average about 7¼-hours. Seventy per cent hot metal is used, and supplies can be drawn when required. There is an ample quantity of hot metal.

But the high productivity cannot be explained solely on the ground of an ample supply of high-quality iron. Great importance is attached to the full standardization of the scrap charge. All the scrap is loaded on 12 cars (of four boxes each), and there are constant proportions of bloom scrap, other mill scrap and bundled scrap returned from the automobile works. This standardization permits charging to be completed in about an hour.

Continuous Casting — It was stated that several experimental continuous casting plants are in use in Russia, mainly for alloy and stainless steels. Some plants have cast thousands of tons but problems of surface quality have still to be solved.

Generally, rolling and finishing departments do not appear to be so advanced as the earlier stages of production, and the Russians are conscious of the fact that much remains to be done.

They plan to substantially increase the production of flat rolled products and to build standard continuous strip mill units, each with an output of 2½-million tons of hot strip. At present, there appear to be only two wide strip mills in Russia, at Zaporojstal and Magnitogorsk. Russian industry is faced with a problem of considerable magnitude, especially as it appears that no Russian built strip mill has been completed.

New Press Is First of a Line

Twin cranks on a new dieing machine line may become the standard for Henry & Wright. They'll permit greater bed area per ton of press capacity

THE FIRST of the all-new dieing machines built by Henry & Wright Division, Emhart Mfg. Co., Hartford, Conn., has been delivered to Chrysler's Highland Park, Mich., plant. It'll be used for progressive die blanking operations on stock up to 48 in. wide.

Two cranks, running from the crankshaft, straddle the lower carriage. Working in unison, they lift and lower this carriage, which is tied to the top carriage. The top carriage holds the upper dies.

Previous H&W machines used only one crank. Working on the middle of the carriage, it didn't preclude cocking, so the practical size of the carriage was limited. Using a crank at each carriage end, engineers are sure they'll get better distribution of forces on both sides of the load. It means they will be able to go to greater bed areas per ton of capacity.

Feed Innovation—Chrysler's 350-ton machine is designed with a special roll feed that puts the stock through front to back rather than the conventional right to left. It takes advantage of bed length to accommodate wide stock. The bed is 54 by 72 in. The cycle can be adjusted for 40 to 80 strokes a minute.

Heat Check — All bearings are lubricated continuously by a recirculating system. Main bearings are constantly checked by thermal switches. If the temperature of any bearing goes over 135°F, the switch disengages the clutch and flashes a warning light.

The twin-crank design is being extended to presses in the range of 25 to 500 tons. More than 25 of the new models, "worth well over $1.5 million," are on the order books. Although H&W will continue to build single-crank models, some company executives predict that, in time, the twin-crank will make its predecessor obsolete.

Building Blocks

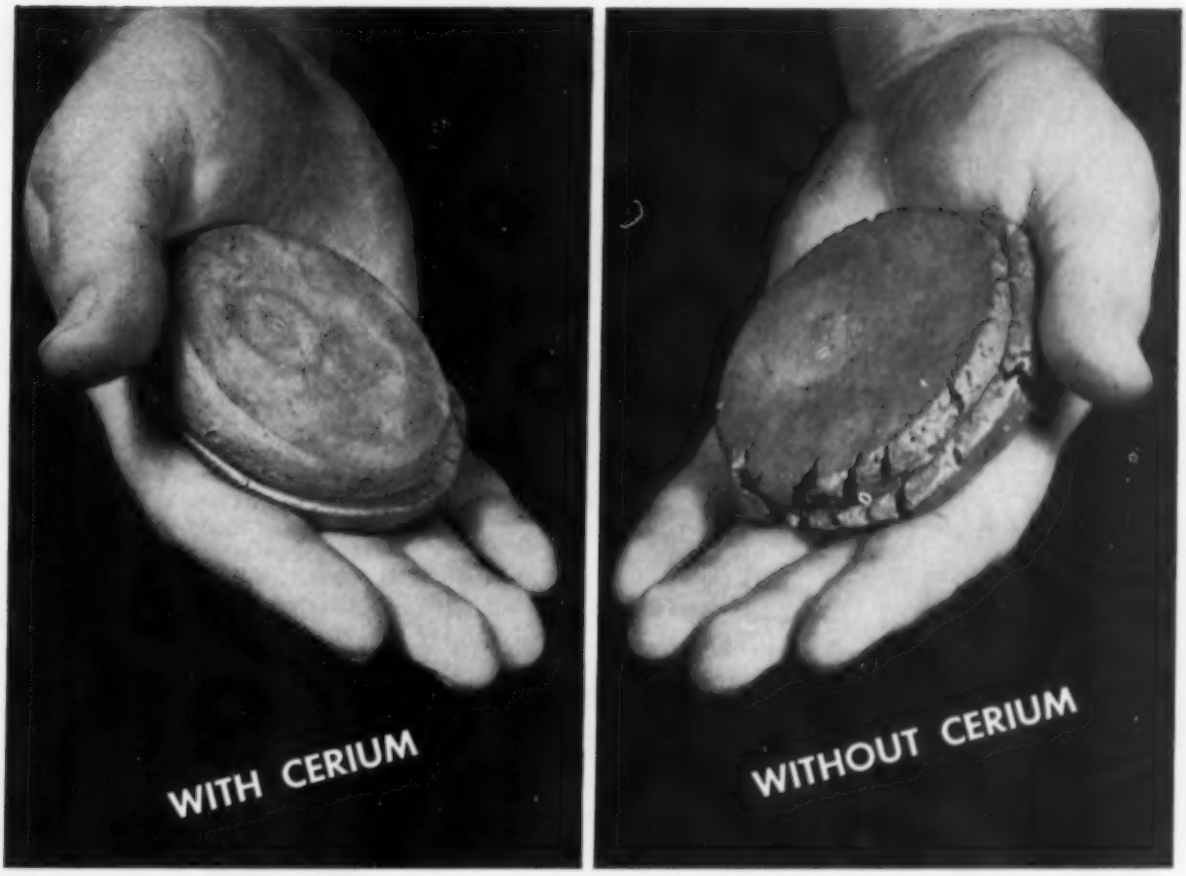
Want to build your own machine tool? Management at Hartford Special Machinery Co., Hartford, Conn., soon will announce a new line of machine "building blocks" that may help.

Going all out to encourage the do-it-yourself trend in industry, Hartford engineers have come up with standard machine bases and columns. They'll be added to the already active line of air-powered hydraulic spindle units. The company will be equipped to sell most of the major components for the shop-built special tool.

At about the same time, Hartford will announce a new leadscrew tapping attachment for the air-hydraulic units. It will rapid feed a dead spindle into position, kick into forward feed and return, and then go into rapid withdraw of the dead spindle.

Builds Abroad

Brown & Sharpe Mfg. Co., Providence, R. I., has bought a tract of land outside Plymouth, England, for an 18,000 sq ft plant. Management expects the plant to be in production on the model OO-G automatic screw machine early next year.



HOW *Carpenter* USES RARE EARTH ELEMENTS TO IMPROVE FORGEABILITY OF ALLOYS FOR ELEVATED TEMPERATURE SERVICE

The value of rare earth elements in certain alloys for elevated temperature service can be seen in this hot forgeability test. Cast cones, identical except for the addition of cerium in one, are heated to forging temperature and upset or hammered into flat "pancakes". Note the relative freedom from cracks and tears in the specimen containing cerium.

What does this improved hot workability mean to you? It means better forged finishes requiring less machine clean-up . . . less wasted steel . . . fewer rejects . . . faster fabricating.

Carpenter alloys for elevated temperature service have an enviable reputation for improved forgeability, and exceptional cleanness which meets the strictest inspection requirements.

Carpenter pioneering in tool steels, super corrosion resisting steels and free-machining stainless steels has helped hundreds of companies to improve products and cut costs. This same specialty mill experience can help you do a better, low cost job on any parts or products you make for high temperature service. It'll pay you to investigate. Contact your Carpenter Representative, or drop us a line on your company letterhead. *The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.*

Specify Carpenter alloys for elevated temperature service and get these three big advantages . . .

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Greater Uniformity
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Improved Alloys for Elevated Temperature Service

come "hell or high water" . . . you can depend upon National Acme for help when you really need it.

Fortunately, most threats to production lines usually come from less serious causes. When they do, an overnight service call or shipment by air from National Acme, prevents serious delays.

Does your shop carry this kind of insurance against costly production losses caused by service delays?

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The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

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Better Gage Blocks

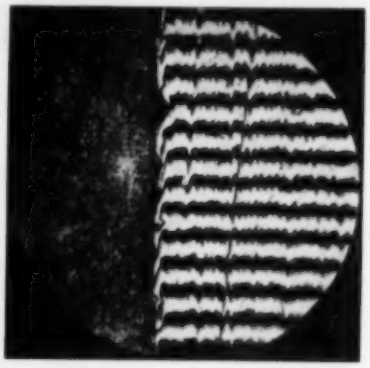
Superfinishing gives an optical surface that increases accuracy, reduces wear

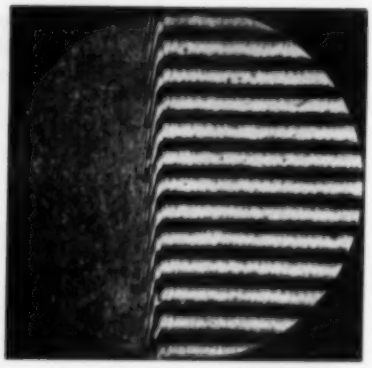
MORE ACCURATE gage blocks are keeping pace with industry's trend to tighter tolerances. Accuracy in ten thousandths calls for precision gages accurate to one millionth of an inch.

One gagemaker, the DoAll Co., Des Plaines, Ill., has adopted a precise manufacturing method to upgrade its products. The firm claims that its AAA grade blocks are more accurate than the highest requirements set by the National Bureau of Standards. Its grade A (plus 4 minus 2 millionths) replaces its grade B.

Surface—Surface finish plays an important part in the superaccuracy of gage blocks. DoAll engineers perfected a method that produces a 0.09-microinch rms finish. A fine surface finish has these advantages:

1. Better contact between gage





Microinterferogram shows the improved edge left by DoAll's burrproofing. Burrs scratch and increase wear

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

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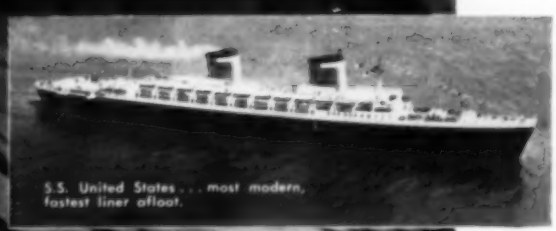

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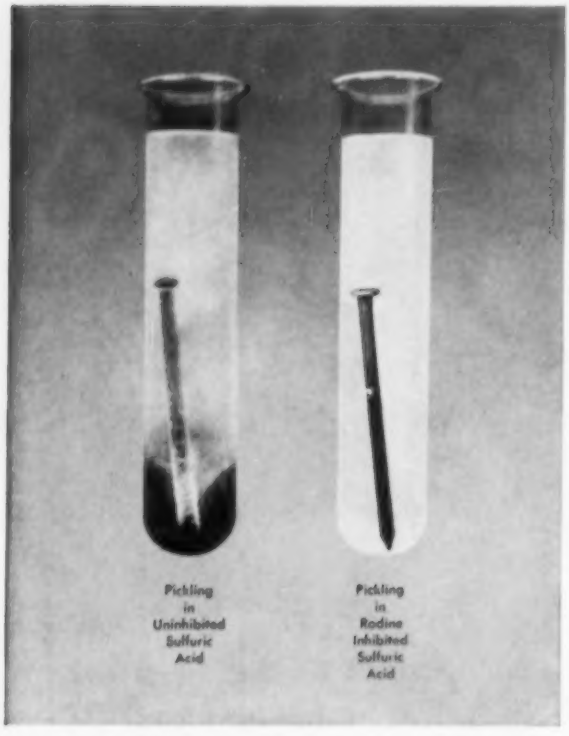
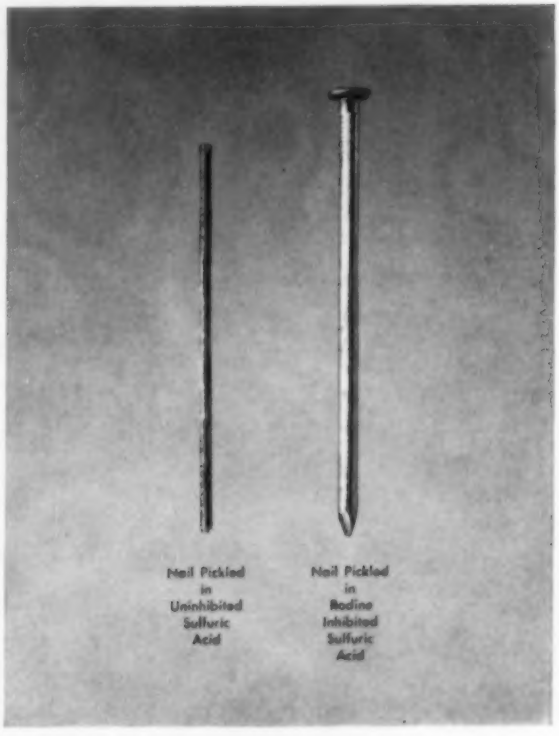
HOW RODINE® CUTS PICKLING COSTS

Tests demonstrate the effectiveness of Rodine in retarding the attack of acid on the metal

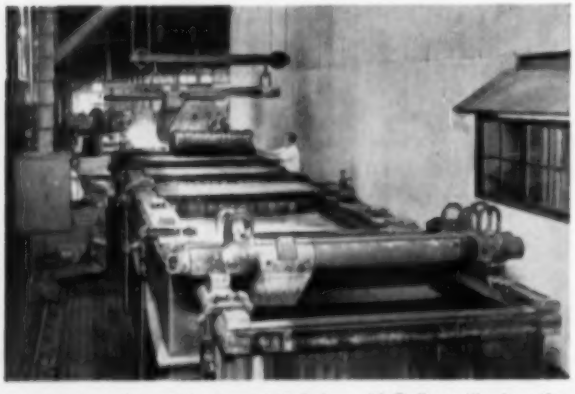
Rodine pickling acid inhibitors retard the attack of the acid on the metal without affecting the ability of the acid to remove scale. Their effectiveness in saving acid and metal is demonstrated by these two simple tests:



Formation of Hydrogen Test. Both test tubes contain a 10% by volume solution of sulfuric acid. In the left-hand tube, the acid is uninhibited. In the right-hand tube, a Rodine inhibitor has been added in an amount equal to 1% by volume of the concentrated acid. There is no bubbling in this tube—Rodine has retarded the formation of hydrogen that is the result of acid dissolving steel.



Loss of Weight Test. Both nails have been pickled in a 10% by volume solution of sulfuric acid for the same length of time. The nail pickled in the uninhibited sulfuric acid solution has lost its form, does not look like a nail any more. The nail pickled in the sulfuric acid solution with Rodine added has lost little weight, has retained its shape and luster.



Rod and wire, tube and sheet are pickled clean with Rodine, without wasting either acid or metal—there are fewer rejects, which means big savings.

Not only does Rodine save metal and acid, but it improves the quality of the pickled product as well. And baths containing Rodine can be operated longer with less acid required to keep them at the desired concentration.

Our treatise on pickling and the use of Rodine, "Efficient Pickling with Rodine," gives full information. Send for your copy today—it makes profitable reading.

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CHEMICALS ACP PROCESSES

surfaces; blocks can be wrung without trapping air.

2. The smoother surfaces wear less, remain at their original size longer. The coarser the surface finish, the greater the wear.

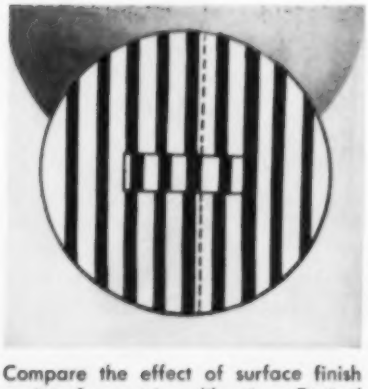
3. DoAll says its gages have an optically flat surface. This enables a visual check by an inspector to determine wear.

4. A high surface finish makes for greater accuracy. Gages are checked by interferometry. The light reflected from the superfine surface shows up as a sharper line. It is easier to check gage size.

Burrs—The edge of a lapped surface is full of fine, wirelike particles which break loose during wringing. These particles scratch and nick block surfaces.

DoAll uses its own process to burrproof its blocks. Gage corners are blended into a parabola which eliminates the wire edge particles.

This company's gage blocks are supplied with a certified inspection report which states the exact size of each block to the nearest millionth.



Compare the effect of surface finish on interferometric calibration. Optical finish (below) gives smooth, clean lines

This 25-TON Hannifin Straightening Press Sells For

$4,133 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice

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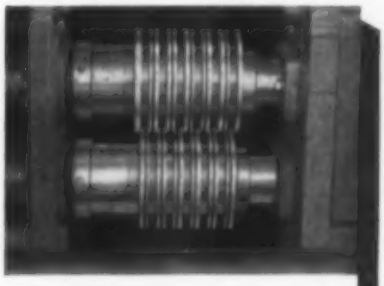
COWLES

SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

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By VINCENT E. LYSAGHT
American Chain & Cable Co. Inc.
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BASIC METHODS—PART I

Hardness Testing

THERE are many concepts of hardness. Each fits a specific purpose in a relatively narrow field. Scratch, dynamic, boring, grinding and abrasive tests make it impossible to define this value within strict limits.

Defined—As it is used here, hardness is resistance to permanent deformation by a specific indenter under a known load. It is the most common definition. It has the widest variety of uses.

Indentation hardness is not fundamental: It depends on several properties. The term means nothing without the conditions of a test. One testing method also is difficult to correlate with another.

Hardness tests are used for the inspection and control of metal heat treatment or cold work or a combination of the two. In addition, the tensile strength of some materials may be estimated. Hardness tests are used in controlling the case in case-hardened materials.

Points — When you choose a hardness test, consider these: Hardness tolerances or limits, speed of test and depth of penetration, adherence to specifications, process control, reliable correlation with tensile values, prediction of fabricating properties, quality control and determination of the fundamental properties of material. Summed up, the test should tell how well a material will fulfill a certain purpose.

Equipment—These are the most common testing machines: Brinell, Rockwell and diamond pyramid hardness testers.

In the Brinell method, the hardness number is the ratio of the applied load (in kilograms) to the surface area of the indentation. The tester is generally a hand operated, hydraulic press which forces the indenter into a specimen. The indenter is a ball 10 mm in diameter. The load, 3000 kilograms for ferrous metals and 500 kilograms for nonferrous metals, is applied for 30 seconds. The diameter of the impression is measured with a reticulated microscope. The hardness number is read from a table.

Rockwell—The Rockwell tester uses a steel ball or a diamond cone penetrator. A minor load of 10 kilograms is applied first and the dial set at zero. A major load (usually 150 kilograms for diamond cone and 100 kilograms for the 1/16-in. ball) is added and then removed. The dial measures additional penetration between the first and second loads. The Rockwell number is read directly on the dial.

Several scales cover the hardness of materials. Each is assigned a different letter. Each has its own major load and penetrator. The major loads are 60, 100 and 150 kilograms; the penetrators are the 120 degree diamond cone penetrator (0.2-mm radius, tangent to

Three popular types of hardness testers: The Vickers (left), Rockwell (center) and Brinell (right). In choosing a tester, remember that it should tell how well a material will do its job

the cone, known as the Brale) and ball penetrators which are 1/16, $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{2}$-in. in diameter.

The combination of the Brale and the 150 kilogram load is known as the C scale and is used for hard steel. The B scale is the combination of the 1/16-in. steel ball and a 100 kilogram load. It is used for unhardened steel, brass, bronze, etc.

Skin—The Rockwell superficial tester is used for testing thin materials and superficially hardened, thin skinned materials. It operates on the same principle, with a minor load of 3 kilograms, a major load of 15, 30 or 45 kilograms. The same 1/16-in. ball penetrator is used on brass, bronze and unhardened steel.

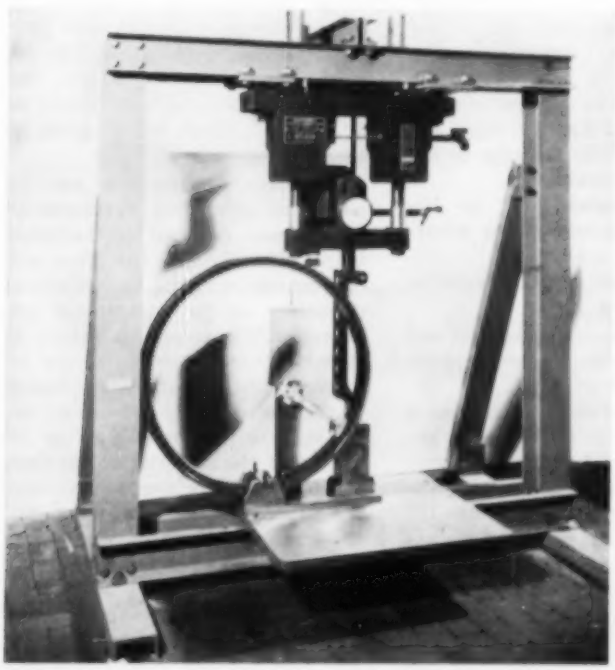
On hard steel surfaces, a diamond Brale penetrator is needed. Because of the smaller penetration and the great precision of the penetrator, it is known as the N-Brale.

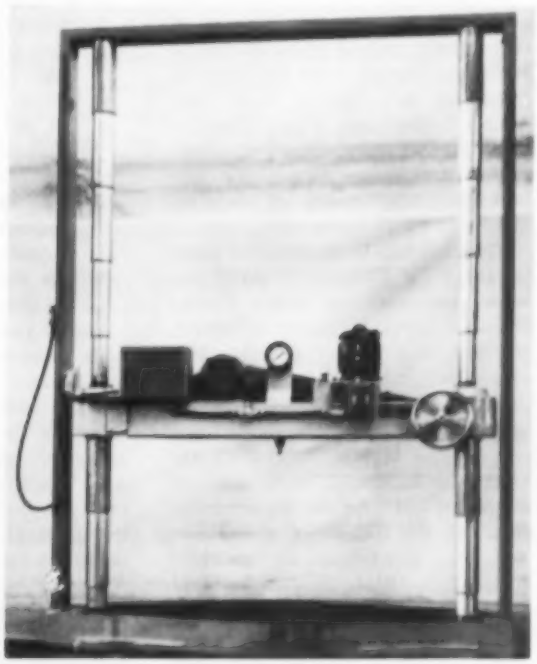
The superficial tester has its own scales. They are designated first by the value in kilograms of the major load used; second by the letter N, if the N-Brale penetrator is used, or the letter T if the 1/16-in. ball is the penetrator; and third, the dial reading.

Vickers — The 136 degree, diamond pyramid, hardness test is like the Brinell. An indenter is pressed into a test material under a selected load. The load is removed and the average length of the two diagonals is measured with a microscope. The hardness is the load divided by the surface area of the indentation.

Loads up to 50 kilograms are generally used. The indenter is a sharp-pointed, square based, diamond pyramid. The included angle between opposite faces of the pyramid is 136 degrees. Best use: Research, especially on sections of odd shapes mounted in bakelite or clamps.

Bounces — The scleroscope is a dynamic hardness tester, used for testing large pieces, especially





These three rigs illustrate the need for sturdy support of test pieces. Rockwells (left and center) are testing a cam and a large ring gear. The machine (right) is a Brinell for large work

Two production versions of hardness testers. The Brinell (left) is air operated. The Rockwell automatically feeds, tests and sorts

where the instrument is brought to the piece. A diamond faced hammer is dropped within a glass tube onto the surface of the specimen. The height of rebound indicates hardness.

Portables—These fall into two groups: 1. A gooseneck type which takes work up to a given thickness and tests inward from the edge of the piece a relatively short distance. 2. Machines which measure hardness in the center of large sheets and large pieces. No one portable tester meets all requirements.

They are likely to sacrifice some accuracy for portability, but if you have space, size or shape limitations, a portable tester is useful. It's not wise to buy portable machines solely because they are less expensive.

Practical—A file is a portable tester. The test is limited to untempered hardened parts and to exploring surfaces for decarburization. At the Timken Roller Bearing Co., blind persons use this method to check the hardness of roller bearing races.

These factors affect the indentation hardness of metallic materials:

1. The test surface must be normal to the load within 5 degrees.
2. The material must not rock or slip.
3. The time under full load and the rate of application must be constant (ASTM specs E 10 & 18).
4. Indentations must not be too close to each other, or to the edge of the specimen. The center of the impression must not be less than 2½-times the diameter from the edge or the nearest impression.
5. The specimen must be homogeneous, except for decarburization tests.
6. The surface must be suitable for the test.

Avoid Errors — Sheet metal and cylindrical parts require special treatment.

Sheet metals should not have a bulge on the side opposite the impression. All tests must be made on a single thickness. If the thickness of the piece is ten times the depth of the impression, test results are reasonably accurate.

The approximate depth of indentation may be determined by subtracting the Rockwell C-scale reading from 100 and multiplying the difference by 0.00008-in. This value does not include the depth of the minor load indentation. The depth of indentation of the 136 degree diamond pyramid is one-seventh the length of the diagonal.

The Brinell test is seldom used for sheet metal. An ideal table will show the limiting thickness of metals for the scale for each testing instrument. With the 136 degree, diamond pyramid test, the thickness of the specimen should be at least 1½-times the diagonal of the impression.

Cylinders — Here is another source of error. The curvature of a specimen reduces the hardness value. With Brinell, the error will be reasonable if the two principal diameters of the indentation are averaged. The minimum radius of curvature must be equal to or greater than five times the radius of the ball. With the Rockwell, error may be considerable if the diameter of the material is less than ½-in. Results are comparative only for rounds of the same diameter. Flats must be carefully prepared, and this should be noted in reports.

Conversion Scales — Different testing instruments are best for selected types of work. The Brinell, for example, is better for cast iron; on the other hand the Rock-

Announcing...

A new Armstrong Insulating Fire Brick for rugged service up to 3000°F.

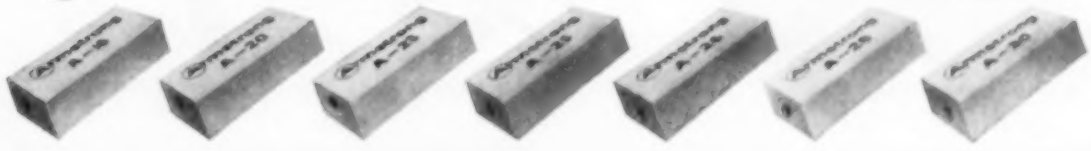
Lightweight and strong, this new Armstrong Insulating Fire Brick is recommended for direct exposure or as back-up insulation for temperatures to 3000° F. Armstrong A-30's high strength, resistance to special atmospheres, and all-over ruggedness also make it equally suitable for jobs where temperatures do not reach 3000° but where service conditions are exceptionally severe. The many uses for A-30 include soaking pit covers, ceramic kilns, forge furnaces, crucible-type melting furnaces, chemical process furnaces, and high-temperature experimental furnaces.

Characteristics of Armstrong A-30 Insulating Fire Brick

Weight of 9" Straight	3.25 lbs.
Reheat Shrinkage (ASTM Standard C210-46)	1.20%
Crushing Strength (ASTM Standard C93-46)	250 lbs. per sq. in.
Modulus of Rupture	140 lbs. per sq. in.
Thermal Conductivity (at 400° mean temp.)	2.80 Btu's
(at 1200° mean temp.)	3.35 Btu's

Get free booklet giving full details and specifications on the entire line of Armstrong Insulating Refractories. Write Armstrong Cork Company, 2706 Reed Avenue, Lancaster, Pa. And for expert help the next time you have a furnace lining or building problem, call in your Armstrong engineer.

Armstrong INSULATING REFRACTORIES



well, is better for sheet metals, heat treated steel, finished ferrous and nonferrous material.

It is not mathematically exact to convert one hardness scale to another. Different machines use different penetrators and loads. The result: Cold working of the material under test is different. Also, the degree of previous cold working affects the indentation and the conversion scales.

It is probably best to test the material according to specification. Conversion tables are established on thick samples and may be checked only under such conditions. Use conversions for flat surfaces only.

Discretion — Conversion is helpful, but it should be used carefully. The National Bureau of Standards determined the correlation between Rockwell and Brinell numbers within plus or minus 10 per cent. (A hardness converter is available from STEEL. Write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.)

Supports — Irregularly shaped pieces must be properly supported. To do this, use special fixtures, penetrators, penetrator extensions, goosenecks and even special machines. These fixtures should be designed for several parts and should be adjustable.

Production Line — Semiautomatic or motorized Rockwell testers have been speeded up for production testing. In the latest designs, the major load is under dash pot control, but the load is removed by a motor and cam. The dial gage is automatically set to zero. Our studies show that the Rockwell number is true when tests are used at the rate of 1000 an hour.

With fully automatic operation, pieces are power fed beneath a diamond penetrator. Testing loads are applied and removed. Transistors pick up the hardness and converts it to electric impulses, which actuate relays. These classify the material according to correct hardness. Remote observation of test results is possible.

The next article on this subject will consider microhardness testing.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

A Gallery of Portable Testers

THE FILE is the oldest portable tester. It's still widely used. Some specifications still call for "file hard."

The test is limited to untempered hardened parts and to exploring surfaces for decarburization.

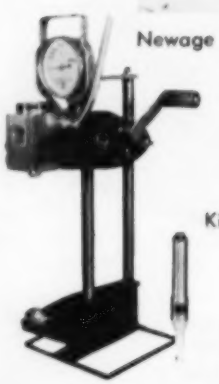
Portables fall into two groups:

1. Gooseneck types which take work up to a given thickness and test inward from the edge of a specimen a relatively short distance. Brand names include Ames, Webster, King and Riehle.

2. Types which measure hardness in the center of large sheets and pieces. Brand names include Barcol, Poldi and Newage.

Generally, portables are not accurate. But they are useful if you have space, size or shape limitations. "Don't buy portables just because they are less expensive," is the author's advice.

Newage metal hardness tester

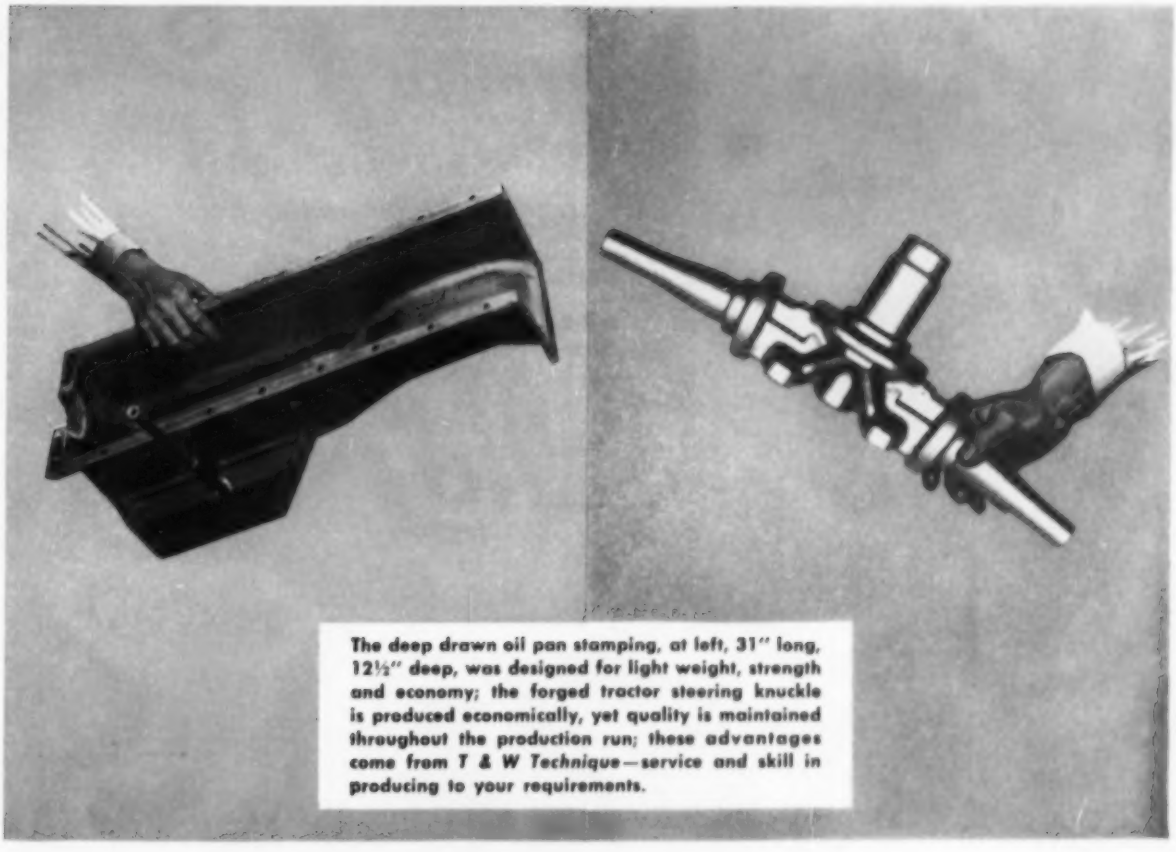


King Brinell tester

A Penetroscope (Tinius Olsen)

Riehle tester

Ames tester



The deep drawn oil pan stamping, at left, 31" long, 12½" deep, was designed for light weight, strength and economy; the forged tractor steering knuckle is produced economically, yet quality is maintained throughout the production run; these advantages come from *T & W Technique*—service and skill in producing to your requirements.

For Stampings, or Forgings, T&W TECHNIQUE produces savings

Many who buy stampings, or forgings, have discovered how *T & W Technique* helps them save time, avoid trouble, save dollars. *T & W Technique* is the special skill and service T & W offers you. It is effective design and engineering service, plus skill which permits making of hard-to-produce parts without delay, plus quality control, and capacity to deliver on schedule. For both stampings and forgings, *T & W Technique*, the know-how from over 50 years of experience, delivers you parts that cost you less at the point of assembly.

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T & W DEEP DRAWN STAMPINGS AND FORGINGS USUALLY COST LESS AT THE POINT OF ASSEMBLY

"SWITCH!" said Ostuco

. . . and savings were surprising!

Pleasant surprise, too! Bearings Company of America, Division of Federal-Mogul-Bower Bearings, Inc. Lancaster, Pa., was machining OSTUCO seamless tubing to make a clutch release bearing collar used as original and replacement equipment. Results were fine!

Then word came from OSTUCO, recommending a switch to OSTUCO's newly developed NP-60, tubing specially processed for machineability. Cost was slightly higher, but BCA and OSTUCO engineers predicted the savings would justify the change.

they switched . . .

. . . and they SAVED!

	Regular	Specially Processed NP-60
Production per 8 hour shift (units)	675	840
Production time per 1000 units (hours) . . .	12.35	10.03
Total Labor per 1000 units (man-hours) . .	13.09	10.63

Besides the savings, Bearings Company of America was pleased with the better finish of the new part. They point out that the collar in photo above "shows the finish as it comes directly off the machine."

It happens this way often enough to warrant checking with OSTUCO about your tubing applications and production problems. Contact your nearest OSTUCO Sales Engineer or write direct to the Shelby factory —there's no obligation!

OSTUCO

OSTUCO TUBING

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CANADA, RAILWAY & POWER ENGR. CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY 225 Broadway, New York 7, New York

Spline Roller Can Do Three Operations in One Pass

Roto-Flo model 1537 can roll a spline with an adjacent thread, oil groove, etc., in a single pass of the forming racks.

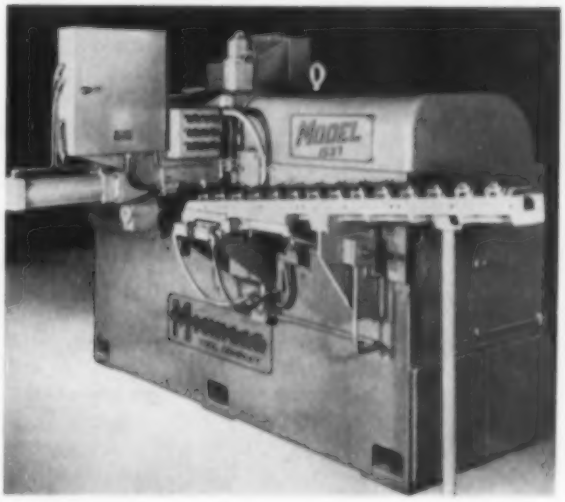
Under certain conditions, a third operation, such as marking, can be added.

Operations can be done on the same or different diameters, but the forms to be rolled must be close together on the shaft.

The entire rolling process takes place in seconds as one continuous operation. Parts have excellent surfaces and tooth strengths.

The machines are available with automation (as shown) or as manually loaded models. If automated, they can be operated throughout the forming cycle without any operator attention.

The machine handles parts from ½ to 2 in. in diameter and from 6 to 26 in. long. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111



Multiple Tube Collector Boosts Gas Cleaning Efficiency

The Cyclo-trell dust collector has a series of cyclone tubes arranged in parallel.

The unit operates by centrifugal force. Incoming gas enters the chamber under pressure and flows into the lower set of inlet tubes. These tubes are attached to the lower header plate and are slightly larger in diameter than the upper outlet tubes.

Special vanes at the mouth of the inlet tubes direct the gas in a circular pattern. Suspended particles are forced downward and outward against the wall of the tube.

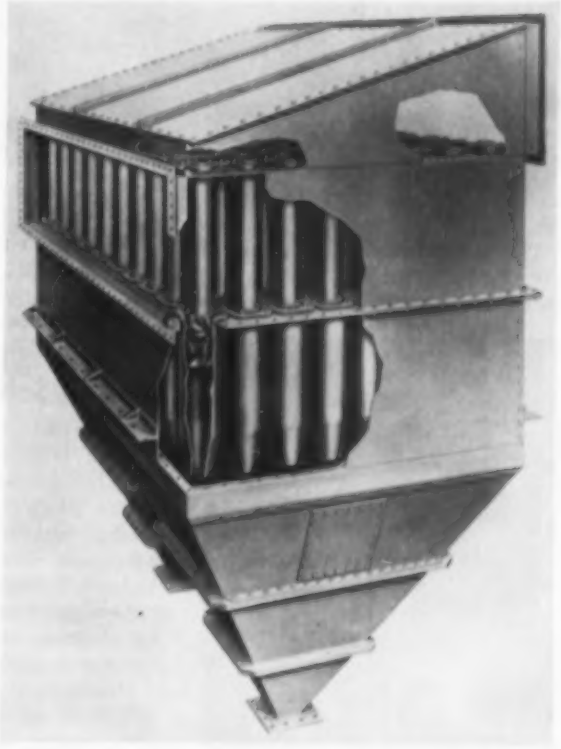
The pressure differential first forces the cleaned gas toward the center of collector tube and then upward into the outlet tube.

Aerodynamically shaped inlet vanes start a fast spiral of incoming gas with a minimum of turbulence. The faster the gases spin, the greater the centrifugal force on the suspended dust in the gas stream.

Drop out and collection efficiency improve as the centrifugal force is increased.

Outlet vanes recover energy in the outlet tube. This increases the capacity of the tube and reduces the number needed per unit. Vanes are positioned below the tube to decrease entry losses.

The shell and hopper are of 7-gage, bolted steel construction. Inlet tubes and vanes are made of cast iron to resist the abrasive force of incoming gas. *Write*: Research-Cottrell Inc., Bound Brook, N. J.



NEW PRODUCTS and equipment

Coil Tong

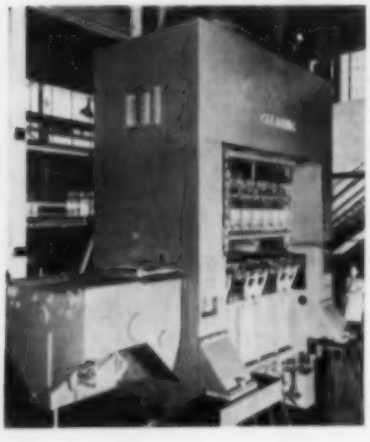
The G-1616 tong uses a four-bar mechanism which makes each member of the grab move in a constrained path in handling metal coils.

It is said to operate more efficiently than grabs using a parallelogram type motion and requiring additional linkages for the constrained motion of the grab levers. *Write*: Mansaver Industries Inc., New Haven, Conn. *Phone*: University 5-3459

Automatic Presses

Transflex presses offer the advantages of transfer press economy in a variety of work.

The automatic feed that carries the part through the press is adjustable. It can be indexed at any distance required by the number and size of dies used.



The feed fingers can be respaced along the feed bar to accommodate varying feed lengths. Fingers may be easily changed to grip parts of different dimensions.

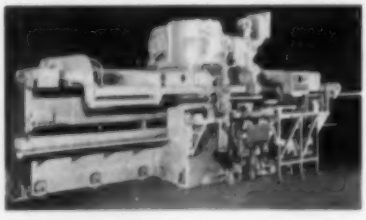
Die cushions are mounted on a track within the press bed. A mechanism outside the bed moves the cushions laterally to the position where blank-holding pressure is desired. *Write*: Clearing Machine Corp., division of U. S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill. *Phone*: Portsmouth 7-8700

Horizontal Broacher

Model 60-90 automatically transfers parts in and out of the work station. Work moves through the broaching station in the same direction as the cutting stroke of the broach.

Either carbide or high speed steel broaches can be used. The broaching cycle is automatic.

Ram speed is infinitely variable from 30 to 150 sfpm. Power for the ram is supplied by a direct current motor served by a motor generator set.



The machine needs a floor space of 194 x 290 in. It weighs about 80,000 lb. *Write*: Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich. *Phone*: Jefferson 6-2550

Molten Salt Pump

An air-driven motor powers this unit. It is designed especially for pumping molten salts and metals.

The pump body is made of a limited number of sturdy parts which are designed for operation under high ambient temperatures. Submerged parts are made of steel or stainless steel (for temperatures over 1000°F).

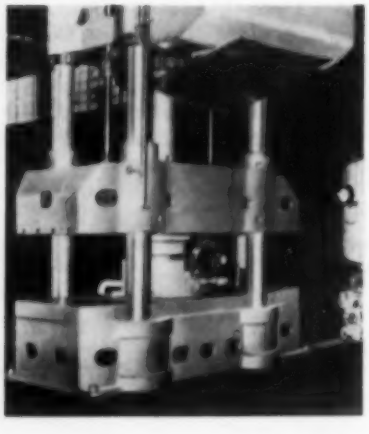
Maximum flow capacity is about 36,000 lb an hour, using 90 psi air pressure. An air intake valve

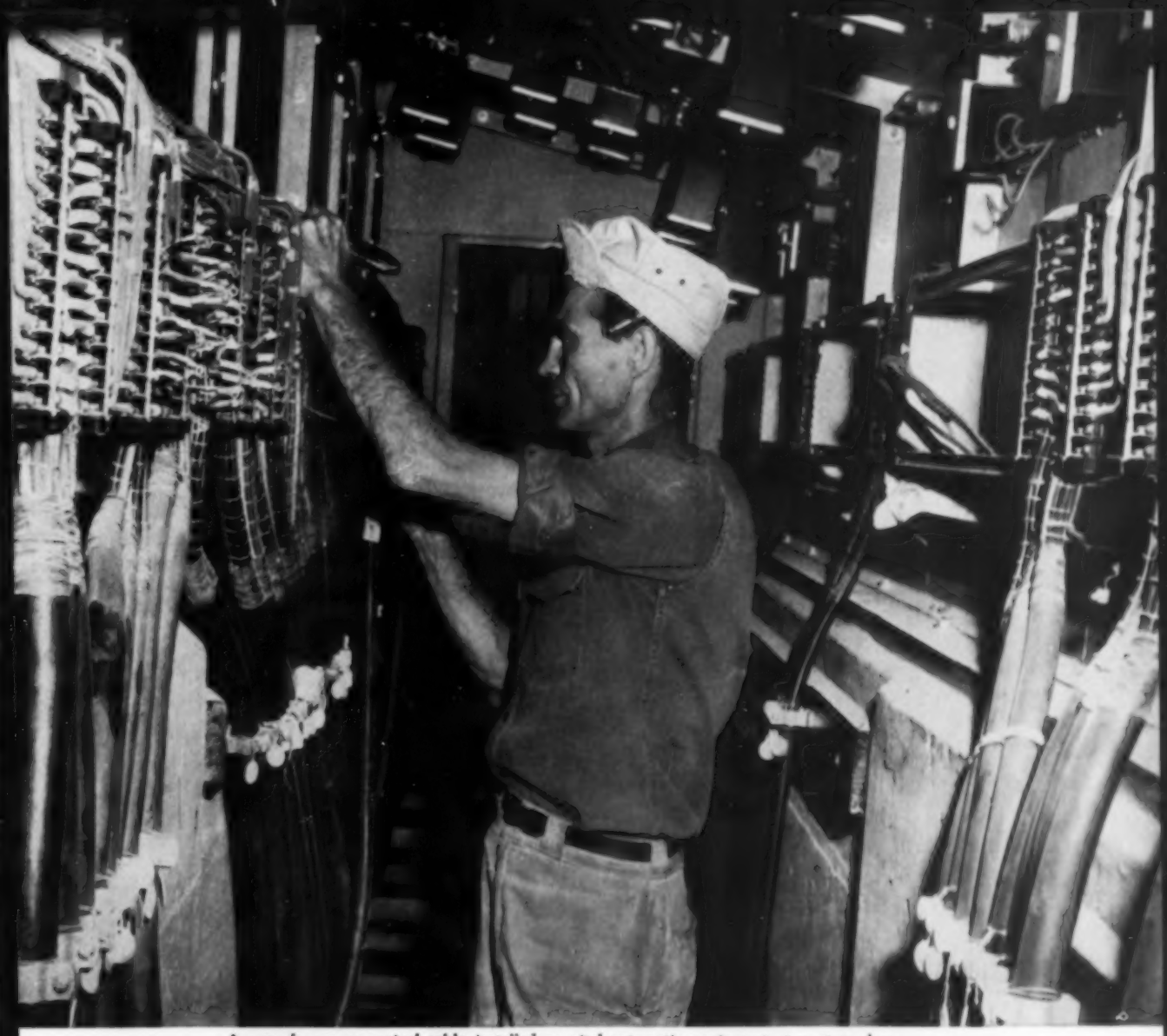
adjusts the volume. *Write*: Ajax Electric Co., Frankford & Delaware Ave., Philadelphia 23, Pa. *Phone*: Nebraska 4-0548

Metal Forming

The Marform Process package unit is adaptable to any conventional hydraulic press. It is said to combine the economy of the rubber pad method of sheet metal forming with the deep drawing ability of the steel die.

The process is for forming parts where surface finish is critical and the shape is complex. Intermediate draws and anneals often are elim-





Anaconda power control cable installed on vital automatic equipment at western dam.

The cables that help keep automation automatic

Where you have automation, remote, supervisory or other types of control, failure of just one wire could be costly – in down-time, upset schedules, damaged equipment. That's why so many automatically say Anaconda for control cable.

You too will rest easier knowing *your* cable is made by people with years of experience in producing the most complex of power cables. At Anaconda, quality control procedures are rigidly adhered to, and research works constantly for better performance.

A big family of Anaconda control cables offers you the *right* cable for every job:

1. *Rubber insulation, neoprene-covered, neoprene jacket over-all*
2. *Rubber insulation, braid-covered, neoprene jacket over-all*
3. *Polyethylene insulation, polyvinyl chloride jacket*
4. *PVC insulation, and polyvinyl chloride jacket*
5. *Polyethylene insulation, nylon-covered, polyvinyl chloride jacket over-all*

Conductors with printed coding are available – speed work, assure accuracy, and are permanently marked. See the Man from Anaconda or your nearest Anaconda distributor for full information and special application engineering aid. Or write about your cable requirements to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

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How SHENANGO CENTRIFUGAL CASTINGS pay off!

NO ROOM FOR TROUBLE... because all these parts have been centrifugally cast by Shenango. Centrifugal action forces all gas and impurities from the molten metal. Defects that ordinarily show up in machining or service are eliminated. Next time you need liners, sleeves, rings, rolls, bearings, bushings, or any annular or symmetrical part, rough or precision finished, contact: Shenango-Penn Mold Company, Centrifugal Casting Division, Dover, Ohio.

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COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

NEW PRODUCTS and equipment

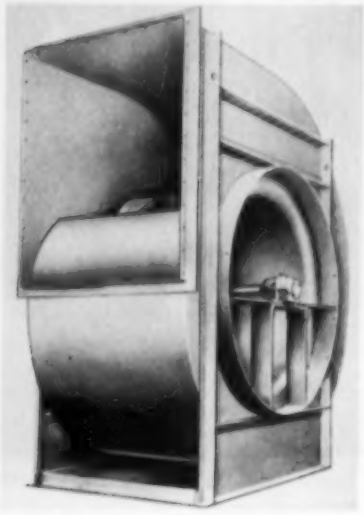
inated. Tapered drawing is wrinkle-free. *Write*: Loewy-Hydropress Division, Baldwin - Lima - Hamilton Corp., 350 Fifth Ave., New York 1, N. Y. *Phone*: Longacre 3-5466

Centrifugal Fans

Series 6000 Silentvane fans are designed for high pressure air conditioning, industrial process ventilation and vehicular tunnel ventilation. They move air at 92 per cent peak mechanical efficiency and 88 per cent static efficiency.

The fans connect to conventional squirrel-cage induction motors operated at standard speeds.

Blade design lowers operating



costs and noise. Wheel diameters of the 16 models range from 27 to 108 in. *Write*: Department 118, Sturtevant Division, Westinghouse Electric Corp., 200 Readville St., Hyde Park, Boston 30, Mass. *Phone*: Hyde Park 3-3700

Machine Tool Relay

The four pole relay is 2 13/16-in. wide and 3 11/16-in. high. Rated at 10 amperes, the 600 volt unit is identified as Class 8501 Type DO-42.

The relay is a companion device to the two pole Type DO-22. Both relays have the same base plates and can be mounted interchangeably.

All contacts are visible for in-

NEW PRODUCTS and equipment

spection and maintenance. The device can be completely disassembled by loosening two screws. *Write*: Square D Co., 4041 N. Richards St., Milwaukee 12, Wis. *Phone*: Edgewood 2-2000

Flooring Material

Corocrete A is a corrosion-proof material which provides protection against alkalies, solvents and acids and has high abrasion resistance.

The material is mixed at the job site for application directly over concrete. Its basic ingredients are a thermosetting resin liquid, a hardening agent and an aggregate-type filler. The material handles like cement topping and is applied in layers from ⅛ to ¾-in. thick. It cures in a few hours to a dense, impermeable and non-dusting surface. *Write*: Ceilcote Co. Inc., 4922 Ridge Rd., Cleveland 9, O. *Phone*: Shadyside 1-4220

Bulk Handler

Model R-15 Moto-Bug has a new automatic power flow transmission which boosts its torque to 200 per cent. Power flow output is cor-

This Niagara Aero After Cooler also cools compressor jacket and intercooler water.

COMPRESSED AIR... Lower in Cost
Dependably Drier and Cooler
Trustworthy for Instrument Use

THE NIAGARA *AERO* AFTER COOLER offers a completely self-contained method replacing both shell-and-tube cooler and cooling tower. It is independent of a large supply of cooling water and consistently reduces compressed air temperatures to below ambient. Its drier air gives you a better operation and lower costs in the use of all air-operated automatic instruments, tools and machines, paint spraying, sand blasting and moisture-free air cleaning.

Direct saving in the cost of cooling water saves the price of the Niagara *Aero* After Cooler in less than two years. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara *Aero* After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter, proven in service on the largest plant utility air systems.

Write for complete information; ask for Bulletin No. 130

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. S, 405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities

M-M's NEW "445" READY FOR ACTION!

with help from Sewall Gears

Minneapolis-Moline's "445" Universal

Here's Minneapolis-Moline's new *Power-lined out-ahead* tractor . . . heralded as one of the biggest advances in power farming history. This is a "user-designed" tractor . . . based on the frank opinions of thousands of farmers, county agents, agricultural experts and farm machinery dealers. Sewall is proud to have supplied gears for the "445".

Sewall's complete gear service can help you . . . call us!

Custom-made gears

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Special gear racks—to order

Standard gear racks—in stock

Our reputation is based on quality, service and price. If you're like our regular customers you're vitally concerned with these three factors when you buy gears. (1) Gears must meet your specifications exactly, in strict accordance with your prints. (2) Gears must be delivered as scheduled. (3) The price must be reasonable. Sewall gears are made by men who are fussy about specifications. We have a wide range of late-model machine tools, inspection instruments and checking equipment regularly serving customers across the nation. Our large modern plant is handy to rail, truck and air transportation.

Let us quote on your specifications!

Write for New 4-page Bulletin

The Sewall Story . . . richly illustrated with in-plant photos . . . includes listing of capacities and facilities.

SEWALL GEARS

E. B. SEWALL MANUFACTURING COMPANY

693 Glendale Street, St. Paul 14, Minn. Midway 5-7721

NEW PRODUCTS and equipment

rected automatically in direct ratio to power requirements.

Speed with the automatic transmission has been increased to 12 mph. The Moto-Bug can climb a 25 per cent grade with a full load of 2000 lb. It has a power ratio of 4:1.

The unit is powered by an 8.3-hp gasoline engine. *Write*: Kwik-Mix Co., Port Washington, Wis. *Phone*: 731

Heating Equipment

This line of rotary and index tables provides automatic, continuous feeding for metal joining and heat treating operations.

The photo shows a typical application which combines high frequency induction heating with a rotary table in the assembly of fuse plugs.

The rotating plate can be replaced quickly with other plates to save setup time. *Write*: Lepel High Frequency Laboratories Inc., Woodside, N. Y. *Phone*: Havemeyer 6-4580

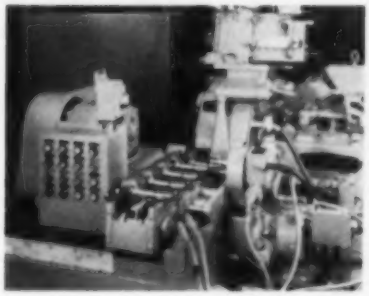
Stem Pinion Grinder

Automotive type pinions are loaded and unloaded automatically by this machine.

Grinding cycle time is preselected on the basis of the stock to be removed and the finish required.

A wheelhead mounted device trues the grinding wheel automatically at predetermined intervals. It also

NEW PRODUCTS and equipment



controls the amount of abrasive removed from the wheel face.

After truing, the wheelhead is reset automatically to compensate for the reduced wheel diameter. *Write*: Norton Co., Worcester 6, Mass. *Phone*: Pleasant 2-4641

Pipe Cleaning

Torno-Blast cleans pipes with diameters from ⅜ to 12 in. without any loss of metal or damage.

The tool has no moving parts; it cleans with a stream of air carrying abrasive material under high pressure. It can be used with conventional sandblasting equipment and can be attached to a standard sandblast hose.

Cleaning rates for tubing range from 1 to 5 minutes per foot. *Write*: Iron City Tool Works Inc., 3201 Smallman St., Pittsburgh 1, Pa. *Phone*: Atlantic 1-6768

Thermocouple Glands

Multiple wire thermocouple glands provide easy entrance into pressure vessels for one, two, four, six or eight wires. The bare wires are sealed against pressures from full vacuum to 20,000 psi.

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Allison Cut-Off Wheels

Cut 1¼" Bar Stock in 6 seconds

• Abrasive wheel cutting is faster than sawing. In many cases it is ten to twenty times as fast.

An abrasive wheel will cut the hardest materials with ease. No need to anneal or otherwise prepare material for cutting.

A properly selected abrasive wheel leaves a finish which requires little, if any, "cleaning-up" operation.

At the left an ALLISON Abrasive Cutting Wheel is shown cutting 1¼" bar stock in 6 seconds per cut.

HOW'S THIS FOR PERFORMANCE?

		Cutting Time
WET CUTTING		
Steel Bar	8" dia. Rotary-type machine	320 seconds
Chrome Steel Bar	4" dia. Oscillating-type machine	105 seconds
DRY CUTTING		
Cold-rolled Steel Bar	1" dia. Chop Stroke-type machine	2 seconds
Angle Iron	1" x 1" x ⅛" Chop Stroke-type machine	2 seconds

Allison ABRASIVE CUTTING WHEELS

It pays to consult a specialist

• Profitable abrasive cutting means using the right abrasive wheel...and the proper abrasive cut-off machine...for the specific job. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

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NEW Literature

Write directly to the company for a copy

Steel Angles

Ideas for using slotted steel angles are given in a 10-page bulletin. Dexion Division, Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

Plating Power

A 12-page guide to germanium and selenium power conversion rectifiers presents models for every direct current power need. Bart-Messing Corp., 125 Manchester Place, Newark, N. J.

Conveyor Belts

A 16-page bulletin discusses factors in the selection of steel processing conveyor belts. Advertising Department, Colorado Fuel & Iron Corp., 575 Madison Ave., New York, N. Y.

Titanium

Corrosion resistance of titanium is described in an 8-page bulletin. Mallory-Sharon Titanium Corp., Niles, O.

Speed Reducers

Specifications and horsepower ratings for double-enveloping worm gear speed reducers are given in bulletin 600-C, 8 pages. Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

Detergent Oils

How to clean sludge out of hydraulic and lubrication systems without shutting down machines is told in technical bulletin 44, 3 pages. Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

Electrical Crane Equipment

Bulletin E-156, 12 pages, describes electrical equipment for cranes and monorail systems. Industrial Crane & Hoist Corp., 1536 S. Paulina St., Chicago 8, Ill.

Electric Furnaces

Rotary-hearth furnaces with top temperatures of 1800 to 2500°F for heat treating parts that are to be fixture quenched or individually handled are covered in bulletin GEA-4073A, 4 pages. Car-bottom furnaces for annealing bar stock, tubes, forgings, steel castings and welded structures are described in bulletin GEA-4068A, 4 pages. General Electric Co., Schenectady 5, N. Y.

Carbide Dies

A 48-page booklet explains how carbide dies solve tooling problems when high production, critical tolerances and part quality are needed. Oberg Mfg. Co., Tarentum, Pa.

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Steel warehouses everywhere are having difficulty maintaining a well rounded stock. However, many steel buyers have found that the very item they have not been able to get elsewhere is in the Levinson warehouse! If the steel you need is not available Levinson may be able to pick up the item for you or offer a suitable substitute.
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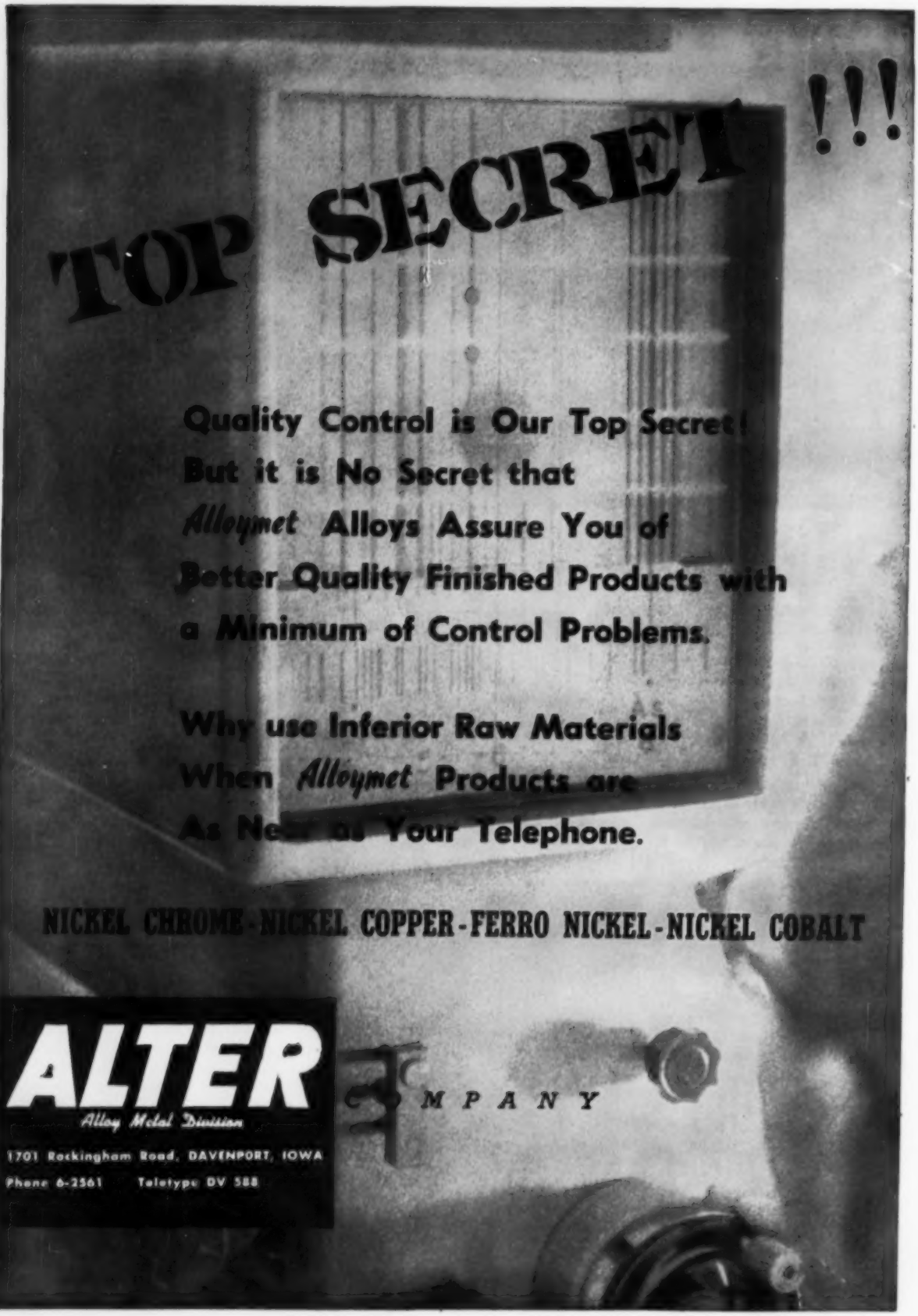
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Market Outlook

A SHOWDOWN on the steel wage issue is likely within the next few days. Steelmakers will begin to curtail operations by midweek in preparation for a possible strike.

Steelmaking operations slipped 1.5 percentage points last week to bring the national ingot rate down to 95.5 per cent of capacity, the lowest since mid-September of last year.

MOUNTING TENSION—The past week has been a period of rising stress in industry circles.

Speculation as to the possibility of an extension of negotiations beyond the June 30 strike deadline did little to ease the strain in the markets. Vacation schedules at many plants are being arranged to fall during the period in which a strike may be in progress.

PRESSURE INCREASES—A renewed flurry of demand has developed for those products that can still be delivered before the end of June. Concern is rising among buyers regarding shipments due them on current contracts.

The warehouses, experiencing a buying spurt as consumers sense the implications for supply in event of a strike, are pressing for all the tonnage they can get. Merchant pig iron buyers also are actively seeking additional prompt shipment tonnage.

IMPACT IMMEDIATE—Manufacturing operations will be affected quickly by a strike. A walkout at the mills will be reflected almost immediately in the curtailment of operations at plate and shape fabricating plants. Their steel inventories are virtually nil.

One eastern fabricator will be forced to suspend within ten days. Other shops, including tank fabricators, take an equally dim view. Consumers of large carbon rounds would be seriously handicapped quickly.

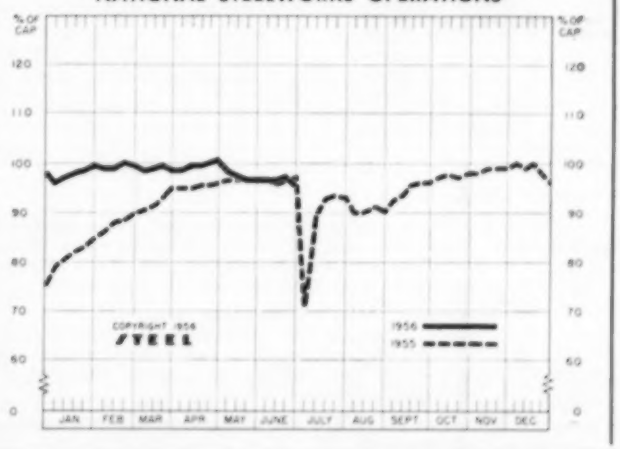
DIFFERENT PICTURE—With regard to consumers of sheet and strip, medium size bars, both hot rolled and cold drawn, alloy bars and wire products, prospects are somewhat better. Inventories of these items are in better shape. Most consumers are said to have enough stocks to support operations 30 days or more. But this doesn't mean all manufacturers will necessarily maintain schedules at an unchanged pace. Chances are, many will curtail output to stretch supplies as far as possible.

SUPPLY VARIES—Steel supply varies as to product. Some items are relatively easy; others are tight. In event of a strike, over-all supply would quickly tighten up.

Plates and structurals are hard to get and will continue scarce the remainder of this year. Gray market plate offerings are more numerous, notably in the light gages, but these do not materially alter the supply picture. Cold-rolled sheets are fairly plentiful. But that isn't the case with hot rolled, which, along with tin plate, is seen in strong demand through the summer. Except for larger sizes, bars are easier.

PRICES—Pending the outcome of the steel wage negotiations, no change in prices is likely. STEEL's finished product index holds steady at $128.98. Rumors have prices rising anywhere from $8 to $15 a ton once a labor agreement is reached. The steel scrap index held unchanged at $46 for the first time since it hit a peak of $55.33 in the week ended Apr. 25.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended June 24	Change	Same Week 1955	Same Week 1954
Pittsburgh	98	+ 2.5*	98	72.5
Chicago	97	— 2*	97.5	82.5
Mid-Atlantic	97	— 1	96.5	57
Youngstown	101	+ 6*	98	72
Wheeling	97.5	— 3	96	87
Cleveland	99	— 2*	101.5	69
Buffalo	105	0	104.5	67.5
Birmingham	23.5	0	93.5	76
New England	85	— 3	92	50
Cincinnati	88.5	— 4	87.5	69
St. Louis	96.5	— 6.5	106	73.5
Detroit	94.5	— 1	97.5	51.5
Western	105	0	108	85
National Rate	95.5	— 1.5	97	73

INGOT PRODUCTION‡

	Week Ended June 24	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	146.6†	143.1	149.2	142.7
NET TONS (In thousands)	2,355†	2,299	2,396	2,292

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 41

Technical Outlook—p. 79

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	June 19 1956	June 12 1956	Month Ago	May Average
(1947-1949=100)	158.2	158.2	158.1	158.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$4.500	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 409 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	170.038
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	256.030
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	41.530
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon (100 ft)	21.360
Bars, H.R., Alloy	9.475	Tubing, Mechanical Stainless, 304 (100 ft)	178.597
Bars, H.R., Stainless, 303 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	9.333
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb.	8.033
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	7.133
Bars, C.F., Carbon	9.000	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.375	Wire, Drawn, Stainless, 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.590		

STEEL's FINISHED STEEL PRICE INDEX*

	June 20 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	210.45	210.45	210.45	194.53	171.92
Index in cents per lb	5.701	5.701	5.701	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.98	$128.98	$128.98	$118.45	$106.32
No. 2 Fdry Pig Iron, GT	60.27	60.27	60.27	56.54	52.54
Basic Pig Iron, GT	59.89	59.89	59.89	56.04	52.16
Malleable Pig Iron, GT	61.27	61.27	61.27	57.27	53.27
Steelmaking Scrap, GT	46.00	46.00	50.17	35.25	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 20 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.55	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.53	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$61.00	$61.00	$61.00	$57.00	$53.00
Basic, Valley	60.00	60.00	60.00	56.00	52.00
Basic, deld. Phila.	63.76	63.76	63.76	59.66	56.49
No. 2 Fdry, Pitts.	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, deld. Phila.	64.26	64.26	64.26	55.16	56.99
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin	62.70	62.70	62.70	60.58	55.33
Malleable, Valley	60.50	60.50	60.50	56.50	52.50
Malleable, Chicago	60.50	60.50	60.50	56.50	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$48.50	$34.50	$45.50
No. 1 Heavy Melt, E. Pa.	47.50	47.50	51.50	37.25	43.50
No. 1 Heavy Melt, Chicago	46.00	46.00	50.50	36.00	43.50
No. 1 Heavy Melt, Valley	47.50	49.50	53.50	36.50	45.00
No. 1 Heavy Melt, Cleve.	45.50	47.50	49.50	31.50	44.00
No. 1 Heavy melt, Buffalo	45.50	45.50	51.50	29.50	44.00
Rails, Rerolling, Chicago	67.50	69.50	71.50	51.50	52.50
No. 1 cast, Chicago	45.50	45.50	47.50	41.50	49.00

COKE, Net Ton					
Beehive, Furn, Connisvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

Daily Nonferrous Price Record

	June 20 Price	Last Change	Previous Price	May Avg.	Apr. Avg.	June 1955 Avg.
Copper	40.00-46.00	May 29, 1956	43.00-46.00	45.098	47.500	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.500	15.500	14.800
Zinc	13.80	Jan. 6, 1956	13.00	13.500	13.500	12.250
Tin	94.75	June 20, 1956	94.625	97.024	99.270	93.668
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	25.900	25.900	23.200
Magnesium	33.75	Apr. 16, 1956	32.50	33.750	33.150	28.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisions.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

(Advertisement)

AL Stainless Steels
for the Process Industries

VARIOUS TYPES—Generally speaking, stainless steels are divided into three groups: chromium, chromium nickel, and chromium-manganese-low nickel steels. Their corrosion resistance, hardenability, tensile strength, etc., varies with the proportion of chromium, nickel and other alloying elements each type contains.

The chromium stainless grades are divided into two types: martensitic steels, which are hardenable; and ferritic non-hardenable steels. Both types are magnetic. The chromium nickel and chromium-manganese-low nickel stainless grades are austenitic steels, hardenable only by coldworking, and are non-magnetic.

The principal chromium stainless steels of chemical industry significance are Types 410, 431 and 440A martensitic grades, and Types 405, 430, 442 and 446 ferritic steels. Chromium nickel austenitic steels of principal importance are Types 302, 304, 316, 317, 347, 309 and 310. In the more recently developed chromium-manganese-low nickel austenitic group, Type 202 has physical and mechanical properties closely approximating those of Type 302—with the advantage of much lower nickel content and more ready availability in times of nickel shortage.

PRINCIPAL GRADES—Industry has called for quite an extensive range of chemical and physical properties in stainless steels. To meet these requirements, types have been developed which are best suited for a particular application: such as Types 316 and 317 for extra corrosion resistance, Types 309 and 310 for extra high temperature service, etc. Knowledge of these stainless steel qualities is essential for engineers and designers to create a product that will best do the work for which it was intended. Complete data on AL Stainless Steels is available in the various publications listed below.

Of all the stainless steels, the grades most used in the chemical and allied industries are Types 304, 316, 317 and 347 chromium nickel steels. The first three grades are also available in extra low carbon varieties to meet extreme conditions of fabrication or service which might carry the threat of intergranular corrosion. Designated Types 304L, 316L and 317L, these low carbon stainless steels are practically immune to carbide precipitation in the as-welded condition. Like Type 347, they permit the field-welding and stress-relieving of material of any thickness, for example, without the hazard of intergranular corrosion.

REGULARLY SUPPLIED FORMS—Allegheny Ludlum Steel Corporation is in position to furnish the various grades of stainless steel in all of the commercial forms required by fabricators of these metals. These include:

- Plates, including formed heads
- Sheets, either coiled or straight cut lengths
- Strip, either coiled or straight cut lengths
- Bars, rounds . . . flats . . . hexagons . . . octagons . . . squares or special shapes
- Billets, for forging or upsetting
- Angles
- Wire
- Tubing, seamless or welded
- Castings and smooth-hammered Forgings
- Extrusions
- Clad stainless

Information as to size ranges and mill tolerances are available in literature devoted to detailed discussions of AL Stainless Steels.

SPECIAL REQUIREMENTS—When selecting a grade of corrosion and heat resisting steel for a given application, it should always be borne in mind that laboratory tests, however carefully performed, can be expected at best to be only indicative of field performance. Variations in actual service conditions are so wide that a special study of the case at hand may be necessary at times. To that end, Allegheny Ludlum engineers and technical men are available for consultation on unusual problems involving stainless applications.

FABRICATION—AL Stainless Steels may be easily fabricated by any of the usual processes—welding, drawing, blanking, machining, spinning, forging, riveting, shearing, soldering, etc. In some instances, however, care must be exercised in handling of the material to preserve its corrosion or heat resisting properties. No one should undertake to fabricate any of the stainless steels without a full understanding of these handling procedures. Proper processing is fully discussed in Allegheny Ludlum literature—available on request.

RESISTANCE TO ATTACK—There is a wide range of conditions under which AL Stainless Steels operate in resisting corrosive attack at normal and elevated temperatures. Detailed information regarding their resistance to various media, heat resistance and strength will be sent upon request. See the publication list below.

STAINLESS CLAD STEEL—Allegheny Ludlum Stainless Clad is available commercially in the following commodities:

- Double Clad—Stainless both surfaces with carbon steel core. In plates, sheets and strip.
- Single Clad—Stainless one side only; plates only 3/16" and heavier.

Special clad materials on application.

PUBLICATIONS AVAILABLE

The following list of technical and service literature is freely available on request; just ask for the bulletins which contain the type of information you need.

Blue Sheets—An individual Blue Sheet, containing certified laboratory data on physical and chemical properties, etc. is available on each grade of AL Stainless Steel.

Fabrication of Stainless Steels—Contains valuable data for your shop men on various methods of handling, forming and finishing stainless steel.

AL Stainless Steel in Chemical Processing—36 pages on various applications, advantages, etc. of stainless in the chemical industry.

Stainless Steel Handbook—A case-bound book of 124 pages, containing complete data leading to the proper selection and fabrication, etc. of the correct grade of stainless for each application.

• Write to *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

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AL STAINLESS STEEL

Nonferrous Metals

Threat of a copper strike ebbs as Arizona locals sign three-year pact with Phelps Dodge. Labor harmony throughout the red metal industry could bring primary prices down

Nonferrous Metal Prices, Pages, 120 & 121

THREE YEARS of peace emerged last week from labor contract negotiations in the copper industry. Phelps Dodge Corp. and Anaconda Co. were the first two producers to sign up with the International Union of Mine, Mill & Smelter Workers. The rest of the industry is following the pattern.

The PD contract is typical. It provides for a 24.3 cent package with increases of 10.1 cents in 1956; 7.1 cents, 1957; 7.1 cent, 1958 (effective July 1 of each year). Pensioners will receive $2.25 a month for each year of service with a maximum of 30 years. Total disability pay will be $80 a month. The contract also improves health and welfare benefits, provides for early retirement and sets up a vested rights program for qualified employees.

Significant—Orville Larson, union vice president, reports: "We feel the new agreement will bring stability to Arizona for the next three years and will eliminate the annual crisis and threat of strikes."

Custom smelters continue to adhere to the 40 cent a pound price. The London Metal Exchange quotation is hovering near 38 cents. Primary producers remain at the 46 cent a pound level. The Rhodesian Selection Trust Ltd. lopped another 2.5 cents per pound off its quotation last week and is selling at 37.5 cents per pound.

Comments one observer: "The significant fact in the move is that the Rhodesian group usually guarantees its price for 30 days This time, it didn't, and it looks as though the group might be willing to move the price to coincide with a stabilized price." Historically, the Rhodesian Selection Group tries to keep its price on a par with or slightly below the LME quotation. Its most recent move not only brings it in line with the LME quotation but also puts added pressure on domestic producers to lower the primary price.

But—Primary producers will not lower prices until they are sure there will be an uninterrupted flow of copper. Reluctance on the part of users to purchase may help to improve inventory situations. So that if labor negotiations are settled without strikes, there will be enough copper to fill the avalanche of orders which will flood producers if they reduce prices to 40 cents a pound or lower.

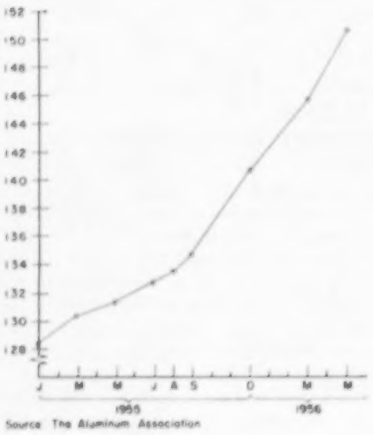
Aluminum Record Falls

U. S. primary aluminum production established another record in May when 150,800 tons were produced, reports the Aluminum Association. Last year's May total: 131,128 tons. Totals through May show that 714,578 tons have been produced, a gain of 82,344 tons over the first five months of 1955.

Primary Aluminum Production

9 Records in 17 Months

(Thousands of net tons)



Source: The Aluminum Association

Aluminum Co. of America plans to expand its die-casting operations by building a $1.5-million plant in Edison Township, N. J. Growing use of aluminum die-cast parts in automobiles may have helped to stimulate interest in this move. Aluminum sales continue at high levels, but several users report that inventories are beginning to bulge. Some continue to purchase extra quantities as they are anticipating a 2 or 3 cent a pound increase on ingot prices in August.

Tin Smelter News

The closing of the government's Texas City smelter, contends Sen. Wayne Morse (Dem., Oreg.), will place the domestic industry "at the mercy of an international tin cartel."

Lynn W. Meekins, director, Malayan Tin Bureau, exclaims: "Senator Morse's comments reveal his colossal ignorance of tin production and marketing. Senator Morse has literally put the cartel before the horse. The Texas City smelter itself is the only undertaking in the world's tin industry which might be considered by some stretch of the imagination to resemble a cartel. There will always be plenty of tin at fair and reasonable prices."

Tin Briefs: 1. Sales are moderate to good. 2. There is a growing rumor that motordom is considering tinning automotive sheet to get a better surface for painting. Tin men are licking their sales chops as they attempt to run down the rumor 3. Dr. W. E. Hoare, assistant director, Tin Research Institute, predicts: "I would not be surprised to see the production of more than 10 million tons of tin plate by 1970." Last year's total: 7.2 million tons.

Lead, Zinc Sales Steady

"Our customers are taking their usual amounts of lead and zinc, but on a hand-to-mouth basis," says one metal producer. Users continue to work off inventories and then order for prompt delivery. Lead sales have shown some improvement in the last week: Zinc sales continue in the doldrums.

Market Memos

- The American Zinc Institute has made it official by announcing that it has retained Battelle Memorial Institute, Columbus, O., to investigate ways and means of successfully anodizing and dyeing zinc diecastings. Battelle will also search for new ways to improve and lower the costs of plating and other finishing operations.

- Members of the Chilean Copper department (government brass who guide the destiny of that country's copper prices) visiting the U. S. are getting a liberal education. Brass mill executives are allowing the south-of-the-border visitors to listen to the complaints of copper users. It appears to be taking hold, and some observers feel that Chile will no longer toy with the idea of excessively priced copper.

Newport Steel

FRIEND OF FOOD

Products of Newport Steel become essential elements in equipment that contributes to making this the best-fed nation in the world. To everyone concerned with food—on farm, in transportation, processing, storage and home—Newport renders important service, just as this 70-year-old mill provides basic ingredients to numerous other segments of our economy. Systematic steelmaking control by highly trained personnel, plus modern equipment and strategic location, makes Newport a logical source for steels to customers' precise specifications. Look over the list of products below and call Newport before you buy.

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

PRODUCTS OF NEWPORT STEEL

- Cold-Rolled Sheets
- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Hot-Rolled Sheets
- Hot-Rolled Pickled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Electric Weld Line Pipe
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 23.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.30; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 46.00 deld. Conn. valley; 46.00 deld. Midwest; custom smelters, 40.00 deld.; lake, 46.00 deld.; fire refined, 46.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $260-$262 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.00 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.25 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.75.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max), $5.25; grade A-2 (0.5% Fe max), $2.95 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99+ % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 15.00; No. 2, 19.00; No. 5, 15.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-27.50; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max, 25.25-25.50; 13 alloy, 0.60 Cu max, 25.25-25.50; 195 alloy, 25.75-26.00; 108 alloy, 24.00-24.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00; grade 2, 23.25; grade 3, 22.50; grade 4, 22.00-22.50.

Brass Ingot: Red brass, No. 115, 35.50; tin bronze, No. 225, 48.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.75; No. 1 yellow No. 405, 30.75; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.93; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.355; l.c.l., 51.98. Weatherproof, 30,000-lb lots, 48.28; l.c.l., 49.03. Magnet wire deld., 15,000 lb or more, $58.68; l.c.l., 59.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $12.60-$13.10; sheared mill plate, $10.00-$12.00; strip, $12.10-$12.60; wire, $9.00-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	69.4	67.9	...	...
0.156-0.172	59.9	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.9	54.4	...	...
0.250-0.281	56.9	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.9
0.750-1.000	53.6	51.6	56.9	55.7
1.062	53.4	51.6	...	53.8
1.125-1.500	51.4	49.7	55.1	53.8
Rolled				
1.563	58.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.0	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.2	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.8
2024-T4*	45.1	51.4
7075-T6*	52.9	60.0

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.05	6	266.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 100.00; .081 in., 78.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 76.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.60	81.40-84.60
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.50-15.00; old sheets, 12.50-13.00; borings and turnings, 6.00-7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 30.50-31.00; No. 2 heavy copper and wire, 28.00-28.50; light copper, 26.00-26.50; No. 1 composition red brass, 22.50-23.00; No. 1 composition turnings, 22.00-22.50; yellow brass

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	67.13b	64.36c	....	67.32	42.000	42.000	41.250
Yellow Brass	55.60	45.65d	56.14	58.51	31.250	31.000	29.000
Low Brass, 80%	60.15	60.00	60.69	62.96	35.375	35.125	34.625
Red Brass, 85%	61.79	61.73	62.33	64.60	37.000	36.750	36.250
Com. Bronze, 90%	63.96	63.92	64.53	66.84	38.500	38.250	37.750
Manganese Bronze	62.68	58.76	67.00	....	28.875	28.625	28.125
Muntz Metal	56.94	52.75	....	....	29.125	28.875	28.375
Naval Brass	58.84	53.15	65.90	62.06	28.875	28.625	28.125
Silicon Bronze	70.48	69.67	70.52	75.50e	40.750	40.500	39.750
Nickel Silver, 10%	70.16	72.49g	72.49	....	35.625	35.375	17.813
Phos. Bronze, A, 5%	84.92	85.42	85.42	86.60	42.125	41.875	40.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

turnings, 13.00-13.50; new brass clippings, 22.50-23.00; light brass, 14.50-15.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 19.50; brass pipe, 18.00-18.50.

Lead: Heavy, 12.50-12.75; battery plates, 6.50-6.75; linotype and stereotype, 13.50-14.00; electrotype, 12.75-13.00; mixed babbitt, 14.50.

Monel: Clippings, 65.00-90.00; old sheets, 65.00-80.00; turnings 65.00-70.00; rods, 65.00-90.00

Nickel: Sheets and clips, 100.00-200.00; rolled anodes, 100.00-200.00; turnings, 85.00-185.00; rod ends, 100.00-200.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 3.00.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.50-18.25; 3003 clippings, 17.50-18.00; 6151 clippings, 17.50-18.00; 5052 clippings, 17.50-18.00; 2014 clippings, 16.50-17.50; 2017 clippings, 16.50-17.50; 2024 clippings, 16.50-17.50; mixed clippings, 16.50; old sheet, 14.50-15.00; old cast, 14.50-15.00; clean old cable (free of steel), 16.75-17.50; borings and turnings, 14.50-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 32.00; light copper, 29.75; refinery brass (60% copper) per dry copper content, 28.00-28.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 32.00; light copper, 29.75; No. 1 composition borings, 26.00; No. 1 composition solids, 26.50; heavy yellow brass solids, 18.00; yellow brass turnings, 17.00; radiators, 20.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 63.79; oval, 62.92, 5000-10,000 lb; electrodeposited, 57.75, 2000-5000 lb lots; cast, 58.04-59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, 113.50; 200-499 lb, 112.00; 500-999 lb, 111.50; 1000 lb or more, 111.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 68.90; 100-600 lb, 60.70; 700-1900 lb, 58.20; 2000-9900 lb, 56.50; 10,000 lb or more, 55.30.

Stannous Chloride (anhydrous): Less than 25 lb, 165.30; 25 lb, 130.30; 100 lb, 115.30; 400 lb, 112.90; 5200-19,600 lb, 100.70; 20,000 lb or more, 88.50.

Stannous Sulphate: Less than 50 lb, 128.10; 50 lb, 98.10; 100-1900 lb, 96.10; 2000 lb or more, 94.10.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

THERMALLOY* quality control at work

obstacle course

How we take the guess-work out of casting quality

At our Elyria Plant, a thorough testing of all castings is conducted by our staff of trained X-ray, chemical and metallurgical technicians to make sure that all Thermalloy castings are of the highest quality.

The broad background of our technical staff, and its record of successfully solving heat-resistance problems, can help you minimize maintenance costs and eliminate expensive breakdowns.

Electro-Alloys offers you a complete research and quality control service that will insure you trouble-free castings.

Let us put our facilities to work to solve your heat-treat problems — call your local Electro-Alloys representative or write for a copy of booklet T-225, *Thermalloy Heat-Resistant Castings Give Longer Service Life*. Electro-Alloys Division, 7046 Taylor Street, Elyria, Ohio.

*Reg. U.S. Pat. Off.—designating not just one but a "group" of alloys—each developed to meet a specific heat and abrasion problem.

HEAT-RESISTANT CASTINGS • TRAYS • MUFFLES
RETORTS • CONVEYOR BELTS • RADIANT TUBES

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
Elyria, Ohio

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 123; to footnotes, page 125.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)
Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 ..73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 78.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
S.Chicago,Ill. R2, U5 .. 68.50
S.Duquesne,Pa. U5 .... 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)
Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 94.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston 85 ..... 101.00
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 .... 84.50
S.SanFrancisco B3 .... 94.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 117.00
Gary,Ind. U5 ..... 96.00
Houston 85 ..... 105.00
Ind.Harbor,Ind. Y1 ... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .... 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 .... 103.50
S.Duquesne,Pa. U5 .... 103.50

SKELP
Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2 .. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 .... 4.225

WIRE RODS
AlabamaCity,Ala. R2 .. 5.375
Aliquippa,Pa. J5 ..... 5.375
Alton,Ill. L1 ..... 5.55
Buffalo W12 ..... 5.375
Cleveland A7 ..... 5.375
Donora,Pa. A7 ..... 5.375
Fairfield,Ala. T2 ..... 5.375
Houston 85 ..... 5.625
IndianaHarbor,Ind. Y1 .. 5.375
Johnstown,Pa. B2 ..... 5.375
Joliet,Ill. A7 ..... 5.375
KansasCity,Mo. 86 ..... 5.625
Kokomo,Ind. C16 ..... 5.475
Los Angeles B3 ..... 6.175
Minnequa,Colo. C10 .... 5.625
Monessen,Pa. P7 ..... 5.375
N.Tonawanda,N.Y. B11 .. 5.375
Pittsburg,Calif. C11 .. 6.025
Portsmouth,O. P12 .... 5.375
Roebling,N.J. R5 ..... 5.475
S.Chicago,Ill. R2 ..... 5.375
SparrowsPoint,Md. B2 .. 5.475
Sterling,Ill.(1) N15 .... 5.375
Sterling,Ill. N15 ..... 5.475
Struthers,O. Y1 ..... 5.375
Worcester,Mass. A7 .... 5.675

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 5.10
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.30
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston 85 ..... 4.70
Ind.Harbor,Ind. I-2 ..... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. 86 ..... 4.70
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 5.25
Phoenixville,Pa. P4 .... 5.15
Portland,Oreg. O4 ..... 5.35
Seattle B3 ..... 5.35
S.Chicago U5, W14 .... 4.60
S.SanFrancisco B3 ..... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange
Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.45
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 .... 5.15
S.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes
Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.45
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston 85 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 .. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 86 ..... 6.85
Lackawanna,N.Y. B2 .... 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 6.75
S.SanFrancisco B3 ..... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .... 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .... 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 .... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .. 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 5.35
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.80
Conshohocken,Pa. A3 .. 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.20
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. P4 ..... 5.10
Houston 85 ..... 4.60
Ind.Harbor,Ind. I-2, Y1.. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 .... 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.725
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1 .4.50

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.35
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.85
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron
Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 ..... 6.725
Coatesville,Pa. L7 ..... 7.025
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 .. 7.425
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston 85 ..... 6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ..... 6.725
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14 .6.725
SparrowsPoint,Md. B2 .. 6.725
Warren,O. R2 ..... 6.725
Youngstown U5, Y1 ....6.725

PLATES, Alloy
Bridgeport,Conn. N19 ...8.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 7.00
Gary,Ind. U5 ..... 6.30
Houston 85 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14 .. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES
Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. P4 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

PLATES, Ingot Iron
Ashland c.l. (15) A10 .. 4.75
Ashland l.c.l. (15) A10 .. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 .... 4.65
Aliquippa,Pa.(9) J5 .... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta(9) A11 ..... 5.15
Bessemer,Ala.(9) T2 .... 4.65
Birmingham C15 ..... 5.15
Bridgeport,Conn. N19 .. 4.80
Buffalo(9) R2 ..... 4.65
Canton,O.(9) R2 ..... 4.75
Clairton,Pa.(9) U5 .... 4.65
Cleveland(9) R2 ..... 4.65
Ecorse,Mich.(9) G5 .... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala.(9) T2 .... 4.65
Fairless,Pa.(9) U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind.(9) U5 ..... 4.65
Houston(9) 85 ..... 4.90
Ind.Harbor,Ind.(9) I-2.. 4.65
Ind.Harbor,Ind. Y1 .... 4.65
Johnstown,Pa.(9) B2 .... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo.(9) 85 .. 4.90
Lackawanna(9) B2 .... 4.65
LosAngeles(9) B3 ..... 5.35
Massillon,O.(9) R2 .... 4.75
Midland,Pa.(9) C18 .... 4.65
Milton,Pa. M18 ..... 4.80
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.35
N.T'wands,N.Y.(9) B11 4.65
Pittsburg,Calif.(9) C11 .. 5.35
Pittsburgh(9) J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago W14 ..... 4.65
S.Chicago,Ill.(9) R2, U5 4.65
S.Duquesne,Pa.(9) U5 .. 4.65
S.SanFran.,Calif.(9) B3 .5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif.(9) C11 .. 5.35
Warren,O.(9) R2 ..... 4.65
Weirton,W.Va.(9) W6 .. 4.65
Youngstown(9) R2, U5. 4.65

BARS, H.R. Leaded Alloy
Warren,O. C17 ..... 6.575

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich.G5 ..... 5.675
Fairless,Pa. U5 ..... 5.725
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.575
Houston 85 ..... 5.825
Ind.Harbor,Ind. I-2, Y1 .5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. 86 ..... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14 .5.575
S.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston 85 ..... 7.05
Ind.Harb.,Ind. I-2, Y1. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 .... 6.80
S.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ... 4.80
Lackawanna(9) B2 .... 4.65

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 5.15
Fontana,Calif. K1 ..... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.90
KansasCity,Mo. 85 ..... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Leaded Alloy
Ambridge,Pa. W18 .... 8.325
Camden,N.J. P13 ..... 8.35
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.30
Warren,O. C17 ..... 8.575

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ..... 6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 ..... 6.30
Camden,N.J. P13 ..... 6.70
Carnegie,Pa. C12 ..... 6.25
Chicago W18 ..... 6.25
Cleveland A7, C20 .... 6.25
Detroit B5, P17 ..... 6.45
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.25
Elyria,O. W8 ..... 6.25
FranklinPark, Ill. N5 ... 6.25
Gary,Ind. R2 ..... 6.25
GreenBay,Wis. F7 ..... 6.25
Hammond,Ind. L2, M13. 6.25
Hartford,Conn. R2 .... 6.75
Harvey,Ill. B5 ..... 6.25
LosAngeles(49) S30 .... 7.70
LosAngeles R2 ..... 7.70
Mansfield,Mass. B5 .... 6.80
Massillon,O. R2, R8 .... 6.25
Midland,Pa. C18 ..... 6.25
Monaca,Pa. S17 ..... 6.25
Newark,N.J. W18 ..... 6.70
NewCastle,Pa.(17) B4 .. 6.25
Pittsburgh J5 ..... 6.25
Plymouth,Mich. P5 .... 6.50
Putnam,Conn. W18 .... 6.80
Readville,Mass. C14 .... 6.80
S.Chicago,Ill. W14 .... 6.25
SpringCity,Pa. K3 .... 6.70
Struthers,O. Y1 ..... 6.25
Waukegan,Ill. A7 ..... 6.25
Worcester,Mass. W19 .... 6.70
Youngstown F3, Y1 .... 6.25

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 5.15

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ..... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 .... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13. 7.425
Hartford,Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 .... 7.725
Massillon,O. R2, R8 .... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .... 7.725
Youngstown F3, Y1 .... 7.425

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 5.15
Birmingham C15 ..... 5.15
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
Fairless,Pa. U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90

Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 .....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5 ....4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2..6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2 ..6.15
Williamsport,Pa. S19 ...6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa.(3) F5 ....4.85
Franklin,Pa.(4) F5 ....4.85
Jersey Shore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.85
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14, 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ...4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2,Y1.4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ..5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2.4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R., (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.20
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1, U5 ....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(38) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.875
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.525
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport, Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ...7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)

	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg,Pa. U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.55
Ind.Harbor I-2	6.10	6.55
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.55
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ...6.60*
Pittsburgh J5 .....5.85†
SparrowsPt. Md. B2 ...5.85†
Warren,O. R2 .....5.85‡
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ...5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div, Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G6 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod., Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburg Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.625
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield, Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles (25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill W14	4.325
S.SanFrancisco(25) B2	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.425
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R3	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

High-Strength Low-Alloy

Bridgeport,Conn. N19	7.56
Carnegie,Pa. B18	7.20
Fontana,Calif. K1	8.95
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.426
Ecorse,Mich. G5	6.526
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.426
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R3	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Indiaharbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y-1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
New Haven,Conn. A7 D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y. (32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2 T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. B18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)	0.36-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	....
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
NewYork W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.60*	9.60*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Warren,O. R3	8.60†	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.85**
Butler,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R3	....	....	....	....	....	13.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.50*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon, Pa. S3	6.85

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Fairless,Pa. U5	8.40	8.65	9.05
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Har. I-2, Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40

Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill. L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O.(24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	7.55
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Millbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P7, P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt., Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P7, P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P7, P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

'A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.50
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.50
Cleveland A7	9.50
Crawfordsville,Ind. M8	9.50
Dover,O. G6	9.50
Fostoria,O. S1	9.50
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	9.50
Massillon,O. R8	9.50
Milwaukee C23	9.70
Monessen,Pa. P7, P16	9.50
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	9.60
Rome,N.Y. R6	9.50
Trenton,N.J. R5	9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(20) M8	163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, Cut (100 lb keg)

To Dealers (32)	
Conshohocken,Pa. A3	$9.65
Wheeling,W.Va. W10	9.95

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(20) M8	163
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150
AlabamaCity,Ala. R2 $9.45
Bartonville,Ill. K4 9.45
Buffalo W12 9.45
Crawfordsville,Ind. M8 9.55
Donora,Pa. A7 9.45
Duluth,Minn. A7 9.45
Jacksonville,Fla. M8 10.01
Johnstown,Pa. B2 9.45
Joliet,Ill. A7 9.45
Kokomo,Ind. C16 9.55
LosAngeles B3 10.24
Minnequa,Colo. C10 9.60
Pittsburg,Calif. C11 10.23
S.Chicago,Ill. R2 9.45
SparrowsPt.,Md. B2 9.55
Sterling,Ill. N15 9.35

Coil No. 6500 Stand.
AlabamaCity,Ala. R2 $9.75
Bartonville,Ill. K4 9.75
Buffalo W12 9.75
Crawfordsville,Ind. M8 9.85
Donora,Pa. A7 9.75
Duluth,Minn. A7 9.75
Jacksonville,Fla. M8 10.31
Johnstown,Pa. B2 9.75
Joliet,Ill. A7 9.75
Kokomo,Ind. C16 9.85
LosAngeles B3 10.55
Minnequa,Colo. C10 9.90
Pittsburg,Calif. C11 10.55
S.Chicago,Ill. R2 9.75
SparrowsPt.,Md. B2 9.85
Sterling,Ill. N15 9.65

Coil No. 6500 Interim
AlabamaCity,Ala. R2 $9.80
Bartonville,Ill. K4 9.80
Buffalo W12 9.80
Crawfordsville,Ind. M8 9.90
Donora,Pa. A7 9.80
Duluth,Minn. A7 9.80
Jacksonville,Fla. M8 10.36
Johnstown,Pa. B2 9.80
Joliet,Ill. A7 9.80
Kokomo,Ind. C16 9.90
LosAngeles B3 10.60
Minnequa,Colo. C10 9.95
Pittsburg,Calif. C11 10.60
S.Chicago,Ill. R2 9.80
SparrowsPt.,Md. B2 9.90
Sterling,Ill. N15 9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa,Pa. J5	172†
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180**
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180**
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	162**
Aliq'ppa,Pa. 9-14½ga. J5	165†
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167**
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P7	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

WIRE (16 Gage)

	Stone	An'ld Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.50 7.90**
Aliquippa J5	7.40 7.925§
Atlanta A11	7.60 8.20
Bartonville(48) K4	7.60 8.20
Buffalo W12	7.50 7.90†
Cleveland A7	7.50 ....
Crawfordsville M8	7.60 8.20
Donora,Pa. A7	7.50 7.90†
Duluth,Minn. A7	7.50 7.90†
Fairfield T2	7.50 7.90†
Houston(48) S5	7.65 8.05**
Jacks'ville,Fla. M8	7.85 8.45
Johnstown B2(48)	7.50 8.10*
Joliet,Ill. A7	7.50 7.90†
Kans.City(48) S5	7.65 8.05**
Kokomo C16	7.60 8.00†
LosAngeles B3	8.45 9.05*
Minnequa C10	7.65 8.05**
Monessen P7(48)	7.40 8.00††
Palmer,Mass. W12	7.80 8.20†
Pitts.,Calif. C11	8.45 8.85†
Portsmouth,O. P12	7.50 ....
Rankin A7	7.50 7.90†
S.Chicago R2	7.50 7.90**
S.SanFran. C10	8.35 8.75**
Spar'wsPt. B2(48)	7.60 8.20*
Str'ling(1)(48)	N15 7.40 8.00††
Struth'rs,O.(48)	Y1 7.50 8.00‡
Worcester,Mass.	A7 7.80 8.20†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	175
Atlanta A11	175
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla. M8	182
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	177
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55

Under-Size Body (rolled thread; not nutted):

½" x 6" and smaller.	61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED

(nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
5/16" to ½" diam., incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95

7/16-in. under. List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.55	20.90
1¼	13	....	25.53	21.25
1½	13	24.24	28.22	23.50
1⅝	13	28.63	33.34	27.76
2	13	32.09	37.37	31.13
2¼	13	36.14	42.09	35.05
2½	12	39.23	45.67	38.05
2½	12	43.22	50.31	41.91
2⅝	12	46.79	54.48	45.38
3	12	49.90	58.10	48.39

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....(16)5.65	
Lackawanna,N.Y. B2	4.725	4.625	....(16)5.65	
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS, Untreated

Cleveland R2	12.15
KansasCity,Mo. S5	12.90*
Lebanon,Pa. B2	12.15
Minnequa,Colo. C10	12.15
Pittsburgh O3, P14	12.15
Seattle B3	12.65

*Treated

AXLES

Ind.Harbor,Ind. S13	7.50
Johnstown,Pa. B2	7.50

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.05
Ind.Harbor,Ind. Y1	8.05
Ind.Harbor,Ind. I-2	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	8.05
Minnequa,Colo. C10	7.90
Pittsburgh J5	8.05
Seattle B3	8.55
S.Chicago,Ill. R2	8.05
Struthers,O. Y1	8.05
Youngstown R2	8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron: Cents

98 + % Fe, annealed	8.50
Swedish, c.i.f., Camden, N.J., c.l. in bags	9.50

Domestic:

F.o.b. Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50

Electrolytic iron:

Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	34.00
Unannealed (99 + % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00

Carbonyl Iron:

98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	

Aluminum:

Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50

Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	41.75-65.25†
Bronze, 5000-lb lots	67.50-71.75†

Copper:

Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*

Manganese:

Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00

Nickel-Silver, 5000-lb lots 62.75-65.25†

Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00†

Tungsten Dollars

Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ in. to less than 1 7/16 in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.35 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier, 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.055"; 0.055" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; dedd. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6.7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		56.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	4	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	40.25	....	43.75	45.25	47.25	50.00	54.25	54.25
305	23.25	30.50	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	25.00	32.00	40.00	....	42.75	45.25	47.50	51.75	54.00	54.00
309	32.50	41.25	48.25	....	55.00	54.00	56.75	60.25	69.00	69.00
310	39.75	50.50	64.75	....	71.00	72.25	76.50	78.25	81.75	81.75
314	....	....	....	....	....	72.75	....	78.25	....	....
316	33.00	41.75	52.75	....	59.75	59.75	62.75	66.00	70.25	70.25
316L	....	....	58.75	....	65.75	66.75	69.75	73.00	77.25	77.25
317	40.25	51.25	65.75	....	76.50	74.75	78.50	81.00	87.75	87.75
321	26.50	33.50	39.75	....	45.75	45.00	47.25	51.25	56.25	56.25
18-8CbTa	30.75	39.50	47.25	....	54.75	52.75	55.50	60.00	68.50	68.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	30.50
304	31.55	37.95	32.50
304-L	34.10	40.90	....
316	36.50	42.75	47.00
316-L	42.30	50.10	....
316-CB	42.50	50.50	....
321	33.25	39.65	37.25
347	36.20	44.35	48.25
405	26.35	33.85	....
410	28.85	33.35	....
430	28.85	33.35	....
Inconel	50.00	65.95	....
Nickel	41.60	56.15	....
Nickel, Low Carbon	43.80	60.55	....
Monel	44.50	60.50	....
Copper*	....	....	46.60

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	33.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.090
18.25	4.25	1	4.75	....	2.305-2.475
18	4	2	9	....	2.675-2.6775
18	4	2	....	....	1.765
18	4	1	....	....	1.600
13.75	3.75	2	5	....	2.245
13.5	4	3	....	....	1.865
9	3.5	..	....	....	1.150
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y., deld.	63.02	63.52	64.02	....
Syracuse,N.Y., deld.	64.12	64.62	65.12	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich., deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	60.00	60.50	60.50	61.00
Akron,O., deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
NewYork, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland,Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,N.Y. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
NevilleIsland,Pa. P6	60.00	60.50	60.50	61.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	61.95	61.95	62.48
McKeesRocks, deld.	....	61.60	61.60	62.13
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	62.26	62.26	62.79
Verona,Trafford, deld.	62.29	62.82	62.82	63.35
Brackenridge, deld.	62.60	63.10	63.10	63.63
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Mansfield,O., deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	67.50	68.00	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, **add $1 per ton.**

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, (freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 (Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie Pa., I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	65.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cent‡; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49*	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.86	13.66	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.50	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.15	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.40	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.21	7.76	7.62	8.89
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.39	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95†§	....	7.31	7.35	...	8.10†§	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.41
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.40	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.24	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.00	....	7.63	7.34	...
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.57	8.11	8.21	9.50
Norfolk, Va.	7.35	...	...	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	45.98	7.99	7.73	8.26	8.52	13.35	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.21	7.27	7.80	8.00	13.15	7.43	7.45	8.72
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	...	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	...	9.49	....	7.85	7.85	...	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.44	7.83	7.74	9.01
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.40§	8.25	8.30	10.50
Seattle	8.75	10.50	10.90	49.60	8.90	8.60	9.15	12.25	14.75	8.50	8.50	10.70
Spokane, Wash.	8.90	11.25	11.05	....	9.05	8.75	9.30	12.40	15.65	8.65	8.65	11.35
Washington	7.78	9.80	8.60	....	8.49	8.24	...	9.40	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; 2—500 to 9999 lb; 3—400 to 999 lb; 4—4000 lb and over; 5—1000 to 1999 lb; 6—1000 lb and over; 7—1500 to 3999 lb; 8—2000 to 3999 lb; 9—f.o.b. local delivery in lots of 10,000 lb and over; 10—2000 lb and over.

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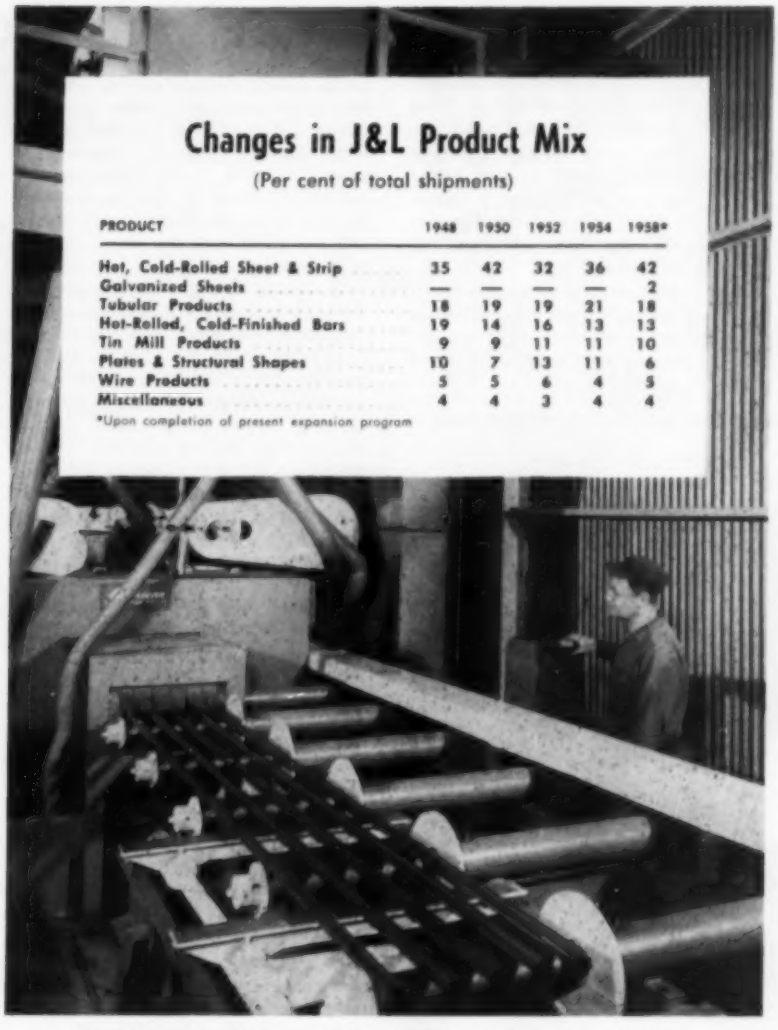
ACME STEEL

Changes in J&L Product Mix

(Per cent of total shipments)

PRODUCT	1948	1950	1952	1954	1958*
Hot, Cold-Rolled Sheet & Strip	35	42	32	36	42
Galvanized Sheets	—	—	—	—	2
Tubular Products	18	19	19	21	18
Hot-Rolled, Cold-Finished Bars	19	14	16	13	13
Tin Mill Products	9	9	11	11	10
Plates & Structural Shapes	10	7	13	11	6
Wire Products	5	5	6	4	5
Miscellaneous	4	4	3	4	4

*Upon completion of present expansion program



Extrusions, like these emerging from a shotblasting machine, are part of Jones & Laughlin's broadened product mix

J&L Undergoes Facelifting

Shift in product mix to lighter gage products and alloy steel has produced important benefits already. Next step may be into stainless steel production

MIXING UP its product mix has been good business for Jones & Laughlin Steel Corp., Pittsburgh. By putting greater stress on the lighter gage steel products and diversifying into alloy steels, the company is cashing in on several fast growing markets and gaining many new customers.

Upon completion of its present expansion program, 42 per cent of J&L's product mix will be hot and cold-finished sheet and strip. This compares with only 35 per cent in 1948 and 38 per cent last year. While tonnage of heavy products will not decline in this move, the percentage will. In 1948, 10 per cent of the mix went to plate and structural shapes. By 1958, it will be only 6 per cent.

Significant — Perhaps even more important is J&L's arrival as a full-fledged producer of alloy steels. For years, the company specialized in carbon steels. But in the last two years, alloy tubing has become more important in its oil country sales. In the past year, alloys also have become important in the production of cold-drawn extruded shapes. Stainless may be the company's next new product, officials hint strongly. Construction of two electric furnaces at the Cleveland Works this year will provide that plant with melting capacity for that product.

Electric furnace steelmaking is only one of several new processes added by J&L. The company will be among the first to make steel by the oxygen converter process, says C. L. Austin, president. In 1954, the firm installed a hot extrusion press for making special sections and intricate shapes at the Pittsburgh Works. Alloy steel extrusions are becoming increasingly more important, and J&L has extruded zirconium and titanium.

In addition to new processes, new products have played a big part in this program. Early this year, a new continuous galvanizing line opened up in the Pittsburgh Works. At the end of the present expansion program, galvanized sheets will make up about 2 per cent of the corporation's shipments. It is introducing new tubular products, including continuously welded and electricweld pipe, which will be produced at Aliquippa, Pa. Two continuous weld pipe mills there will take the place of three hand-operated units. A new mill will produce electricweld pipe.

"We also will produce a considerably enlarged line of oil well casing and tubing, including new and better joints and more of the high-strength products needed for deeper wells," Mr. Austin says.

Potential—Entry into new product lines and processes makes J&L a present or potential supplier of important growth industries. For example, if atomic reactor work demands more zirconium extrusions, or if demand grows suddenly for extruded titanium, the company stands ready. Other customers are in such growing industries as specialized machinery and airframe sections.

Although it's too early to judge the full importance of these changes, J&L is already reaping important benefits. Sales officials comment that, of the first 200 customers for its galvanized sheet, half had never before bought steel from the firm.

Tubular Goods . . .

Tubular Goods Prices, Page 126

Merchant pipe orders are slowing down this month, possibly in anticipation of a more sluggish industrial pace in early third quarter. Sales of tube required for lancing operations in steelmaking are below May levels. This indicates steel production will drop from second quarter levels in July and August.

Seamless tube for oil country use

continues to move extremely well, and other large diameter tube products are generally in tight demand. This includes line pipe. Weakness has occurred in some of the tube specialties, in mechanical tube and tubular products required by steelmakers.

Steel Bars . . .

Bar Prices, Page 123

The bar mills will end the second quarter with the lightest volume of arrearages in a long time, exceptions being in the larger sizes. Larger sizes have been scarce all along and now appear to be even scarcer.

In most other sizes, the mills are fairly current, and consumers seem to be carrying comfortable inventories. Most users of cold-finished bars appear to be well stocked.

New York area sellers say that while market activity is still fairly good, bars are in noticeably easier supply in that district, tonnage being available for July shipment, depending on size and mill.

One large producer says that while it is not trying to sell bars to other than regular customers, it is in position to supply its trade with more tonnage than originally allotted for third quarter.

Pending settlement of the steel wage negotiations, sellers wonder how firm are the orders on their books. If there is no steel strike, some buyers may be disposed to cancel certain hedge tonnage, especially if prices are increased sharply and there is likelihood deliveries will not fall before the price revisions become effective.

In the Pittsburgh district, the mills report consumers still are placing orders on 45-day lead time. Area mills have open space for August and September orders. Meanwhile, they note increased pressure from warehouses seeking to get in as much tonnage as possible before the end of this month.

With hot-rolled bars more easily available in the Midwest than at any time this year, cold finishers find their procurement problems greatly simplified. Nevertheless, there are some sizes and grades of cold-drawn bars in sufficiently good demand to still require the expediting of steel shipments from the mills.

Cold finishers anticipate no appreciable business pickup before the fourth quarter. Automotive and farm implement industries, two important customers, may be more actively in the market by that time.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 123 & 124

Sheet and strip are easier to obtain than they were earlier in the year, but supplies are somewhat tighter than at the beginning of June. At least one midwestern producer was current on shipments at the end of May. Now he will have a carryover into July.

Sheet consumers have been able to accumulate some inventories on hot-rolled material, but not so much as some would like. An increasing amount of the hot mill output has been going into strip-plate. In addition, strong pressure has been exerted for tonnage for processing into tin mill products because canners have been particularly active in stocking steel against the possibility of a steel strike.

A large consumer in the Pittsburgh district has been receiving offers of additional allotments of cold-finished sheet for July and August delivery. Silicon sheet must be ordered well in advance of delivery date, but some extra tonnage can be received in the third quarter.

Buffalo mills have noted some tapering in buying of flat-rolled products by a number of smaller industries which had been in the market actively this half. Indications are that many of these plants have built up

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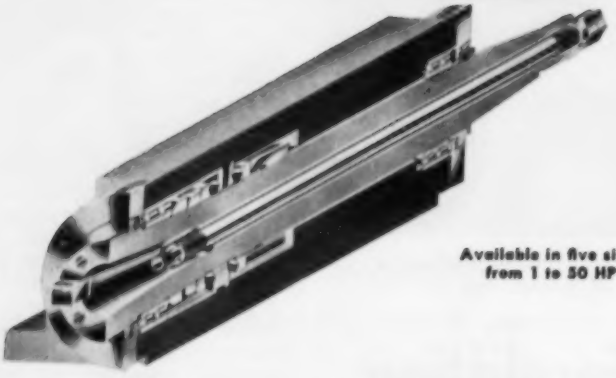

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fair inventories and are looking for reduced demand for their products in the third quarter.

Demand is still light from the automotive, appliance and farm implement industries; heavy from the construction, railroad equipment and machine tool industries.

Calstrip Steel Corp., Los Angeles, has completed a building program that has added 5000 sq ft of space for production of flat-rolled products. Trade reports are that Calstrip will roll more costly metals to thin gages and close tolerances for the aircraft industry.

Tin Plate . . .

Tin Plate Prices, Page 124

Tin plate buyers are not concerned about higher prices since their present contracts extend well into the fall, but they are leaving no stone unturned in their efforts to get in as much tonnage as possible this month as protection in the event of a steel strike.

Shipments of steel shipping barrels and drums are running ahead of last year's. According to the Census Bureau, 12,568,351 units were shipped so far this year against 11,330,579 in the like period of 1955. The April movement was ahead of that in March by 2 per cent, 3,343,881 units against 3,282,830. It was about 13 per cent ahead of that in April, 1955 when 2,953,838 units were shipped.

The uptrend also applies to steel shipping packages, kegs and pails. The total number of units shipped in the first four months of this year was 26,004,627 against 23,323,198 in the like 1955 period. April shipments amounted to 7,013,345, compared with 6,794,802 in March and 6,674,064 in April a year ago.

Production stoppage at U. S. Steel's Tennessee Coal & Iron Division's Alabama plant has tightened tin plate supplies as demand has been diverted to other producing points. One producer in the Pittsburgh area says tin plate will be one of its two most promising steel products for third quarter sales.

Plates . . .

Plate Prices, Page 122

Consumers are pushing the plate mills hard for tonnage due them on second quarter contracts. The mounting pressure for shipments is increasing as uncertainty rises with respect to the outcome of steel wage negotiations.

Despite the mills' efforts to get out tonnage, a substantial quantity of second quarter orders will be undelivered by June 30. Indications are the mills will have an average carry-

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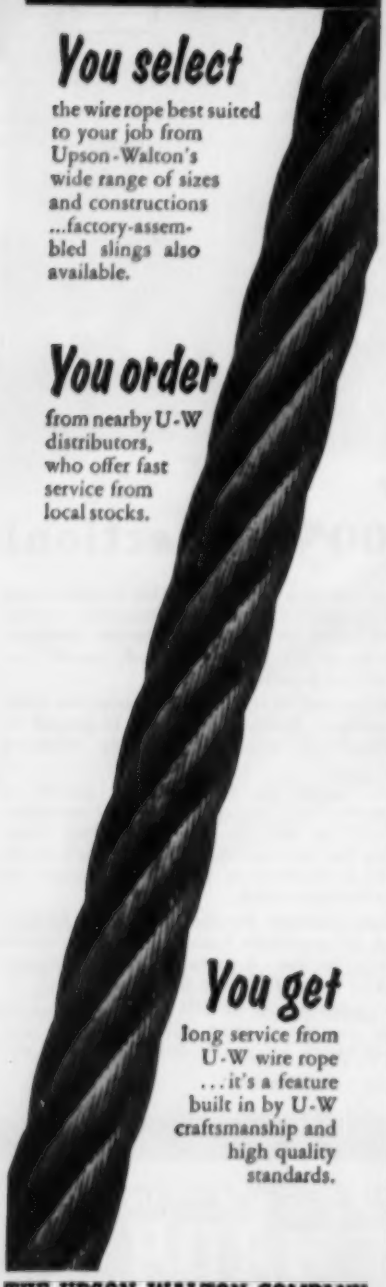

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over of around four weeks of production going into the third quarter.

Plate supply has been further tightened by a recent stoppage at the Homestead Works, U. S. Steel Corp. A fire in a large transformer closed down the 160-in. and the 100-in. plate mills. The 160-in. mill resumed production June 15, while the 100-in. mill started up again on June 17.

Electrical equipment producers, and other fabricators in the Pittsburgh area, say they expect tightness in plate over 2-in. thick will continue through the last half of this year. Some extra tonnages of light gage plates are becoming available through conversion deals advertised to Pittsburgh firms by companies in Detroit and Chicago. Detroit is reportedly a center of light gage plate conversion deals at present.

The scarcity of plates is a headache for fabricators in bidding on new business. As a result, most of them are moving cautiously in going after new work.

Structural Shapes . . .

Structural Shape Prices, Page 133

Should a steel strike be called at the end of this month, both structural and plate fabricating shops will have to quickly curtail operations since they are operating on limited inventories of shapes and plates.

Some shape fabricators will have to suspend operations within ten days.

The limited inventories account for the efforts being made to get in all tonnage possible before the end of the month.

Awards in the New York market are not up to what they were a month ago (possibly reflecting uncertainty as to prices and steel mill operations this summer), but a substantial volume of work is reported being figured.

Meanwhile, structural fabricating shops are booked up for months into the future and progress in meeting commitments will depend on steel supply. In this connection, operations at the Trenton, N. J., plant of American Bridge Division, U. S. Steel Corp., have been curtailed by an unauthorized strike.

Structural awards in the Pacific Northwest last week totaled 4000 tons. Jobs in the less than 100-tons category are holding up well in the area. Pending work includes several sizable tonnages.

Midwestern fabricators fear the consequences of a steel strike. They are operating at the highest capacity steel availability permits. They are booked into 1957. And new construction projects insure good business for several years ahead. Any setback in

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production of shapes and plates could be most damaging.

Inland Steel Co. has its full range of wide flange beams on the market. The final section, and largest (24 in. from flange to flange, with 9 in. flange), was rolled early in June. The company's wide flange mill began operations Sept. 13 last year. Since then, one size—12 x 6 x 2-in.—had been rerolled often enough for the mill to set five successive production records.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

42,625 tons, six bridges, Acadian thruway, to American Bridge Division, U. S. Steel Corp., Pittsburgh; South Louisiana Turnpike Commission, Donaldson, La.

11,150 tons, superstructure, New Orleans and Algiers approach viaducts, Greater New Orleans bridge, to Bethlehem Steel Co., Bethlehem, Pa., $8,516,829.

3000 tons, University of Washington, teaching hospital addition, to Isaacson Iron Works, Seattle; Sound Construction & Engineering Co., Seattle, general contractor, low at $5,933,930.

2250 tons, superstructure, Spokane river bridge, Spokane, Wash., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Washington Toll Bridge Authority, $1,596,152.

800 tons, office building, Aetna Life Insurance Co., Hartford, Conn., to Standard Structural Steel Co., Hartford; George A. Fuller Co., New York, general contractor.

775 tons, state highway grade separation structures (girders), near Belleville, Ill., to Stupp Bros. Bridge & Iron Co., St. Louis.

650 tons, high school, Lower Merion, Pa., to Easton Steel Structures Inc., Easton, Pa.; also 105 tons of bar joists; to American Bridge Division, U. S. Steel Corp., Pittsburgh.

400 tons, recovery furnace structure, Camas, Wash., for Crown Zellerbach Corp., to Bethlehem Pacific Coast Steel Corp., Seattle; L. H. Hoffman, Portland, Oreg., general contractor.

400 tons, hospital, Lancaster, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, state bridge, Lehigh county, Pa., through A. C. Hack & Sons Inc., Bloomsburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

395 tons, St. Luke's Hospital, Bethlehem, Pa., to Bethlehem Fabricators, Bethlehem, Pa.

315 tons, railroad grade separations, Du Page, Cook and Berkeley counties, Illinois, to Vierling Steel Works, Chicago.

225 tons, armory, Dover, Del., reported placed with a Baltimore fabricator.

200 tons, Bonneville power system transmission towers, to Bethlehem Pacific Coast Steel Corp., Seattle, low at $72,981.

140 tons, three state bridges, Thompson-Pomfret-Killingly, Conn., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Stanley J. Ziobro Inc., Seymour, Conn., general contractor.

140 tons, airplane apron construction, Renton plant, Boeing Airplane Co., to Bethlehem Pacific Coast Steel Corp., Seattle.

100 tons, gantry traveling crane for Pelton dam project, Oregon, Portland General Electric Co., to Colby Steel & Mfg. Co., Seattle, low at $110,435.

100 tons, plant, Du Pont interests, Parkersburg, W. Va., to Belmont Iron Works, Eddystone, Pa.

STRUCTURAL STEEL PENDING

1000 tons, contract P-129, tunnel product, Baltimore, C. J. Langenfelder & Son, Baltimore, awarded general contract.

895 tons, six grade separations and one bridge over railroad, Connecticut turnpike project 329-01, Plainfield; bids July, 2 Hartford.

490 tons, 16 generator unit covers, St. Lawrence power project; bids June 28, Hydro-Electric Power Commission, Toronto, Ont.

420 tons, railroad plate girder bridge, Eagle

(Please turn to page 138)

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Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.8c for max 0.15% C grade from above prices. 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 78% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 32.55c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 46.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 25-42%, Al 5% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 34.75c, 1.5% max 34.60c, 2.0% max 34.50c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 0.05% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 30.05c per lb of contained Cr; 1" x down, bulk 30.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 20-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.8c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 95c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $0.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb. f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 2000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.3c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.85c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.5c. Packed, pallets 7.5c; bags 8.35c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.23 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 8: (Si 45-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 26-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Bigio, Tenn., $80 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo. f.o.b. Langeloth, Pa.: $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)....nom.	24.00-25.00
Brazilian iron ore, 68-69%	23.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.00-$35.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.30-$1.35 nom., per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05-$1.10 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1 ....nom.	$45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$26.00-$28.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.10

Antimony Ore

Per unit of lb content, c.i.f. seaboard

55-60%	$3.40-$3.85
60-65%	3.85-3.95

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279 Danville, Ill., $281; Philadelphia, Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis $259.45; Bridgeburg, Pa. $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $198; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Bilmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Detroit, ovens	27.50
Detroit, deld.	28.75
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00
Birmingham area	36.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60% $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

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4. Special roll combinations available for beams, channels, flats, pipe, etc.
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PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA. 38

(Concluded from page 133)

Gorge project, near Seattle; bids to U. S. Engineer, Seattle, about July 14; also 1060 ft of H piling.

267 tons, state bridge work, Beaver county, Pa.; bids July 6.

250 tons, also 22 tons of reinforcing and 3000 ft of piling, Washington state, Whatcom county steel truss highway bridge; bids to Olympia, Wash., July 3.

100 tons or more, Montana state McCone county 644-ft bridge; bids to Helena, Mont., June 28.

Unstated, 82 gates and miscellaneous steel items, 19.4 mile laterals and wasteway; Donald M. Drake, Portland, Oreg., low at $449,032 to the Bureau of Reclamation, Ephrata, Wash.

Unstated, eight Alaska highway spans totaling 250 ft in length; I-beam; bids to the Alaska Road Commission, Juneau, Alaska, July 10.

REINFORCING BARS . . .

REINFORCING BARS PLACED

965 tons, addition to teaching hospital, University of Washington, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

550 tons, municipal sewage work, Pattison avenue, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, government munitions storage, Philadelphia, to Taylor-Davis Inc., that city.

130 tons, St. Pius School convent, Philadelphia, to American Steel Engineering Co., that city.

100 tons, design building, Electric Boat Division, General Dynamics Co., Groton, Conn., to Bethlehem Steel Co., Bethlehem, Pa., Turner Construction Co., Boston, general contractor.

REINFORCING BARS PENDING

1800 tons, steel piles, 10 grade separations and two box culverts, Connecticut turnpike project 328-01, Lisbon-Griswold-Plainfield; bids June 25.

970 tons, eight grade separations, four box culverts, Connecticut turnpike project 327-01, Norwich-Lisbon; also 715 tons, steel piles.

370 tons, three state highway bridges, Manchester, N. H.; bids in.

160 tons, Washington state highway jobs, Thurston county, two bridges: Fiorito Bros., Seattle, awarded at $926,650; T. T. Burnham, Seattle, awarded at $102,034.

160 tons, Washington state highway bridge, Pierce county; bids to Olympia, Wash., July 3.

150 tons, Montana state highway projects, McCone, Daniels and Carbon counties; bids to Helena, Mont., June 28.

140 tons, railroad bridge, Eagle Gorge project; bids to U. S. Engineer, Seattle, about July 14.

115 tons, including structurals, Skew span bridge, Nonnewaug river, Woodbury, Conn.

100 tons, two Bureau of Public Roads bridges, Lane and Clackamas counties, Oregon; bids to Portland, Oreg., June 29.

PLATES . . .

PLATES PLACED

200 tons, elevated water tank, Charlotte, N. C., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, water tank and tower, veterans hospital, Pittsburgh; to Hammond Iron Works, Warren, Pa.

100 tons, water tank and tower, Ipswitch, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

225 tons, boiler plate (500 plates); bids to the Corps of Engineers, Chicago.

150 tons, jet fuel bulk storage tanks, Fairchild Field, Washington state; Lord-Carroll Co., Portland, Oreg., low at $98,552 to the U. S. Engineer.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago, Rock Island & Pacific, ten 1750-hp diesel locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Louisville & Nashville, 500 seventy-ton pulp wood cars to ACF Industries Inc., New York.

Maine Central, 20 seventy-ton covered hopper cars to the Pullman-Standard Car Mfg. Co., Chicago.

Railway Express Agency, 500 refrigerator cars to General American Transportation Corp., Chicago.

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Scrap . . .

Scrap Prices, Page 140

Pittsburgh—Uncertainty over the possibility of a steel strike affects scrap purchasing currently. Quotations remain unchanged, owing to lack of sales. Most observers agree the mills will need less scrap in July and August than in second quarter. Electric furnace operators experienced production declines in June, and their demand for scrap has dropped, resulting in lower quotations.

Philadelphia — Scrap prices are nominally unchanged, except for a reduction in short shoveling turnings to $36-$37, delivered, and in drop broken machinery to $54-$56.

Buying of steel grades is at a virtual standstill, pending developments in steel labor contract negotiations. Most district mills deferred indefinitely those shipments that could not be loaded on cars by June 22.

Should a strike be called, scrap prices will undoubtedly go lower. Should a walkout be averted, the market may advance sharply.

Boston—Prices are still sagging, with shipments slowing. New buying is light, and most old orders are being filled with some cars held up prior to vacations. One ship is loading for export. Cast is off $2 a ton.

New York—Scrap brokers' buying prices are unchanged and are largely nominal. Buyers and sellers alike are awaiting the outcome of the steel labor negotiations.

Buffalo—Dealers shipped against a June 22 deadline as the scrap market remained dull here last week. Prices are nominally unchanged, but a weak undertone is apparent. Dealers report a heavy influx of out-of-district scrap by lake vessel and barge canal. Also, June orders of the leading local consumer are only 20 per cent of what that buyer had been taking monthly. On the other hand, scrap is coming to dealers' yards in much smaller volume than a while back when extremely high prices prevailed. Some dealers are reported having trouble filling this month's small orders. Little new buying is expected until the steel wage question is settled. But even should a strike be averted, July demand is thought likely to be slow.

Cincinnati—The scrap market here is unusually quiet as consumers adopt a wait-and-see attitude with respect to the steel wage negotiations. Dealer intake has slowed down with generators reluctant to sell at current price levels.

Cleveland—The scrap market is inactive. Except for one representative sale of electric furnace grades in the Valley last week, the market is without feature. No change in the situation is expected until the current steel wage negotiations are out of the way.

Last week one district mill canceled all outstanding scrap orders. Indications are shipment holdup orders will be coming from the mills early next week unless prospects for an amicable agreement in the labor dispute materially brighten.

Steelmaking scrap prices are sentimentally off about $2 per ton, reflecting the Valley sale of electric furnace grades $3 under previously prevailing quotations.

Detroit—Scrap prices are unchanged. The market undertone, however, is a little stronger. Indications are that prices now are pretty close to bottom. Currently, the district ingot rate is estimated at 94 per cent of capacity. This compares with 96 a week ago, and 93 a year ago.

Chicago—Uncertainty over steelmaking operations after June 30 has brought steel mill scrap buying to nearly a standstill. Except for a few items, prices are unchanged, but the market tone definitely is soft.

It is figured that mills shortly will be notifying suppliers when shipments must stop if there is a strike. Expected date: Around June 24. Without this precautionary measure, scrap shipments could pile up outside mills at month end and incur heavy car demurrage charges.

St. Louis—Scrap prices are unchanged, except for some revisions in the railroad items. The mills aren't pressing for tonnage and little is being offered by dealers. Random length rails dropped $4. Those 18 in. and under are off $2. Rerolling rails are up $1.

Birmingham — An attempt was made last week to test the steel scrap

(*Please turn to page* 142)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 20	$46.00
June 13	46.00
Apr. Avg.	54.90
May 1955	34.87
May 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	44.00-45.00
No. 2 bundles	36.00-37.00
No. 1 busheling	44.00-45.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	*52.00-53.00*
Heavy turnings	42.00-43.00
Punchings & plate scrap	*52.00-53.00*
Electric furnace bundles	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Charging box cast	46.00-47.00
Heavy breakable cast	46.00-47.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	56.00-57.00

Railroad Scrap

No. 1 R.R. heavy melt	51.50-52.50
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	61.00-62.00
Railroad specialties	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	360.00-375.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 bundles	*45.00-46.00*
No. 2 heavy melting	36.00-37.00
No. 1 bundles	*45.00-46.00*
No. 2 bundles	33.00-34.00
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*28.00-29.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Low phos.	*47.00-48.00*
Cut structural plates 2 ft and under	51.00-52.00
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	*45.00-46.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	39.00-40.00
Stove plate	50.00-51.00
Heavy breakable cast	43.00-44.00
Unstripped motor blocks	28.00-29.00
Brake shoes	38.00-39.00
Clean auto cast	51.00-52.00
Burnt cast	38.00-39.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt	*49.00-50.00*
R.R. malleable	*54.00-55.00*
Rails, 2 ft and under	*62.50-63.50*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	*57.00-58.00*
Cast steel	*51.00-52.00*
Railroad specialties	*51.00-52.00*
Uncut tires	*52.00-53.00*
Angles, splice bars	*57.00-58.00*
Rails, rerolling	*61.00-62.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	105.00-115.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*47.00-48.00*
Machine shop turnings	*29.00-30.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*34.00-35.00*
Low phos.	*48.00-49.00*
Electric furnace bundles	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*

CHICAGO

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	48.00-49.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	33.00-34.00
No. 1 busheling	44.00-45.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	52.00-53.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Angles, splice bars	62.00-63.00
Rails, rerolling	*67.00-68.00*

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	36.00
No. 2 heavy melting	32.00
No. 1 bundles	39.00
No. 2 bundles	27.50
No. 1 busheling	38.00
Machine shop turnings	23.00
Mixed borings, turnings	23.00
short shovel turnings	27.00
Punchings & plate scrap	56.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	25.00
Clean auto cast	51.00
Malleable	51.00

BIRMINGHAM

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Cast iron borings	20.00-21.00
Short shovel turnings	27.00-28.00
Machine shop turnings	25.00-26.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.50-49.50
Stove plate	47.00-48.00
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft	50.00-51.00
Unstripped motor blocks	37.00-38.50
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt	45.00-46.00
Rails, 18-in. and under	60.00-61.00
Rails, rerolling	65.00-66.00
Rails, random lengths	56.00-57.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	47.00-48.00
No. 2 bundles	37.00-38.00
No. 1 busheling	47.00-48.00
Electric furnace bundles	50.00
Mixed borings, turnings	34.00
Machine shop turnings	32.00
Short shovel turnings	*36.00-37.00*
Heavy turnings	43.00-44.00
Structurals & plates	51.00-53.00
Couplers, springs, wheels	60.00
Rail crops, 2 ft & under	64.00

Cast Iron Grades

No. 1 cupola	48.00
Malleable	67.00
Heavy breakable cast	52.00
Drop broken machinery	*54.00-56.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	40.00-41.00
No. 2 bundles	30.00-31.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	27.00-28.00
Low phos. (structural & plate)	44.00-45.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	32.00-34.00
Heavy breakable	44.00-45.00

Stainless Steel

18-8 sheets, clips solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*36.00-36.50*
No. 2 heavy melting	*26.00-26.50*
No. 1 bundles	*36.00-36.50*
No. 2 bundles	*25.00-25.50*
No. 1 busheling	*36.00-36.50*
Machine shop turnings	*20.00-20.50*
Mixed borings, turnings	*23.00-23.50*
Short shovel turnings	*24.00-24.50*
No. 1 cast	42.00-42.50
Mixed cupola cast	*37.50-38.00*
No. 1 machinery cast	43.50-44.00

BUFFALO

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	45.00-46.00
No. 2 bundles	33.00-34.00
No. 1 buseling	45.00-46.00
Mixed borings, turnings	27.00-28.00
Machine shop turnings	26.00-27.00
Short shovel turnings	28.00-29.00
Cast iron borings	27.00-28.00
Low phos.	50.00-51.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	54.00-55.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	50.00-51.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	33.50-34.50
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	28.00-29.00
Cast iron borings	28.00-29.00
Low phos., 18 in.	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	43.00-44.00
Craging box cast	43.00-44.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt	45.00-50.00
Rails, 18 in. and under	65.00-66.00
Rails, random lengths	58.00-59.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	36.00
No. 2 bundles	30.00
No. 1 busheling	36.00
Machine shop turnings	†
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	30.00
Heavy breakable cast	30.00
Unstripped motor blocks	30.00
Brake shoes	42.00
Clean auto cast	45.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.50
Rails, 18 in. and under	*62.00*
Rails, random lengths	*56.00*
Rails, rerolling	*70.00*
Angles, splice bars	52.00

†Nominal

SEATTLE

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	30.00-31.00
No. 3 bundles	20.00
Machine shop turnings	23.00-25.00
Mixed borings, turnings	23.00-25.00
Electric furnace No. 1	52.00-54.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*42.00-45.00*
Heavy breakable cast	36.00-38.00
No. 1 wheels	37.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	30.00-31.00
Brake shoes	38.00

Railroad Scrap

Rails, rando mlengths	43.00-44.00

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
Machine shop turnings	17.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00

SAN FRANCISCO

No. 1 heavy melting	43.00
No. 2 heavy melting	40.00
No. 1 bundles	42.00
No. 2 bundles	35.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Heavy turnings	20.00-23.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Stove plate	39.00
Heavy breakable cast	39.00
Unstripped motor blocks	38.00
Brake shoes	35.00
Clean auto cast	48.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

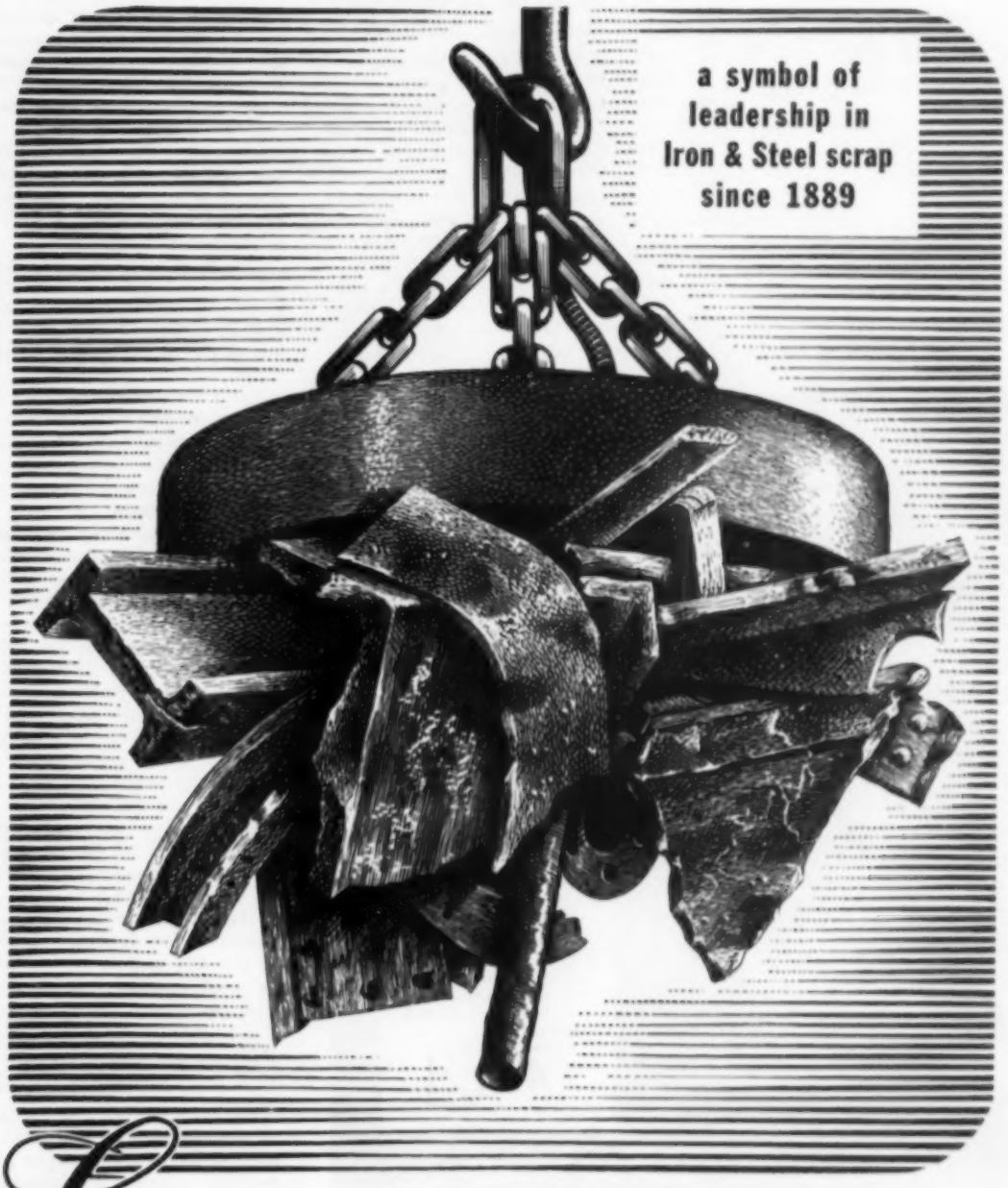
HAMILTON, ONT.

No. 1 heavy melting	*43.00*
No. 2 heavy melting	*18.00*
No. 1 bundles	*43.00*
No. 2 bundles	*15.50*
Mixed steel scrap	*37.00*
Busheling, new factory:	
Prepared	*41.00*
Unprepared	*37.00*
Short steel turnings	*26.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.



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(Concluded from page 139)

market by the largest consumer in the district. Brokers were given orders to purchase limited tonnage at $3 under currently quoted prices. They reported dealer resistance and have been unable to supply even a small part of the limited order. Dealers' supplies are low, and little scrap is coming into yards. Higher prices are expected in event a steel strike is avoided.

Los Angeles—Auto wreckers are reducing collections for the summer, creating a fear in some quarters that a scrap shortage may result. No improvement in the market situation is noted.

San Francisco—Steel scrap is holding its recently won price advance, but there is a tinge of nervousness in the market. New buying is light, pending outcome of steel industry wage negotiations.

Seattle—The scrap market continues active. Receipts are heavy and turnover continues large.

Foreign buyers are holding out of the market for the moment. Overseas chartering appears to have passed the peak. Full cargoes, trans-Pacific, which reached a high of $195,000 recently, have been closed for August-September loading at $175,000. Two ships were reported taken, California to Formosa, at $210,000 and $185,000, respectively, free load and discharge. Another deal was reported for the June position, New Orleans to Japan, at $27.50 a ton, free in and out.

The Pacific Westbound Conference announced an extension to Aug. 31 of the $24 a long ton freight rate on used straight rails to Japanese base ports.

Pig Iron . . . .

Pig Iron Prices, Page 127

Pig iron demand has declined due to the approach of the vacation season and to the accumulation of inventories at consuming points. Merchant iron producers have been busy, however, shipping as much tonnage as possible by the end of June.

Vacation schedules and slowdowns in some steel consuming industries make it possible for producers to make much-needed repairs. American Steel & Wire Division took a blast furnace out of production at its Donora (Pa.) Steel Works June 15 for complete relining. The project is expected to require 45 days.

Rated capacity of Mystic furnace, Everett, Mass., which will resume operations next month, is unchanged. Rebuilding of this stack (out since late 1955) was more than a routine relining job. Design changes include

higher cooling plates and improved material handling facilities.

New England melting shops will hold suspensions to usual vacation periods because the bulk of their moderate order backlogs for castings are for nearby delivery. The slackening in automotive requirements has not affected shops in that area. Demand for castings is steady from makers of machine tools, textile mill equipment, paper making machinery and electrical appliances.

Foundries in the Pacific Northwest are facing a critical shortage of pig iron, due in part to heavy intake of foreign iron by Japan.

Iron Ore . . .

Iron Ore Prices, Page 136

The Great Lakes ore fleet hauled 3,205,802 gross tons in the week ended June 18, reports the Lake Superior Iron Ore Association. This was the first 3-million-ton week this year, and compares with shipments of 2,925,205 tons a year ago.

Cumulative shipments to June 18 were reported at 25,867,540 tons. This compares with 22,523,241 in the like period of the 1955 season.

The Fuji Iron & Steel Co. is reported to have contracted to import Canadian iron ore from the Quatsino properties near Vancouver, B.C.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 136

Production of coke in April, 6,633,363 net tons, was down slightly from the 6,896,593 tons produced in March, but was up about 500,000 tons from the 6,130,916 tons produced in April, 1955, reports the U. S. Bureau of Mines. Of total output in the month, 6,379,919 tons were oven coke and 253,444 tons, beehive.

Production in the calendar year to May 1, was 26,931,673 tons, of which 25,900,885 tons were oven coke and 1,030,788, beehive. This compares with 23,559,897 tons in the like period of 1955, of which 23,216,663 tons were oven and 343,234 tons beehive coke.

Producers' stocks of oven coke at the end of April totaled 1,742,772 tons, equal to 8.2 days production. This compares with 2,485,179, equal to 12.4 days output a year ago.

Semifinished Steel . . .

Semifinished Prices, Page 122

Jones & Laughlin Steel Corp. has issued a revised extra card on hot-rolled carbon steel skelp. The new card is dated May 21 and supersedes a list dated Jan. 4, 1956. Only one change is effected in the list, an increase of 5 cents to 15 cents in the

Shipments of Finished Steel—April, 1956

(All grades, net tons)

Products	Carbon	Alloy	Stainless	Year To Date 1956	Year To Date 1955
Ingots, etc.	39,150	17,662	2,457	294,023	174,139
Blooms, slabs, etc.	155,981	52,374	3,810	898,564	896,236
Tube rounds	191	290	3	1,726	NA
Skelp	18,417	.....	.....	62,138	50,061
Wire rods	94,715	2,045	375	406,792	378,291
Structurals	471,983	5,821	3	1,846,961	1,479,094
Steel piling	32,624	2	.....	133,873	103,975
Plates	658,968	50,727	2,891	2,710,873	1,999,042
Rails (standard)	120,494	.....	.....	464,918	416,837
Rails (all other)	8,169	.....	.....	40,382	23,268
Joint bars	16,272	.....	.....	37,025	19,237
Tie plates	30,601	.....	.....	139,154	100,750
Track spikes	11,242	.....	.....	40,563	29,625
Wheels	30,114	65	.....	121,895	93,730
Axles	15,642	45	.....	60,409	33,899
Bars (hot rolled)	633,865	162,169	5,347	3,305,052	2,764,609
Bars (reinforcing)	228,483	.....	.....	801,843	589,434
Bars (cold finished)	135,219	26,398	5,458	694,210	594,139
Tool steel	1,750	9,979	.....	44,816	35,220
Standard pipe	262,628	54	.....	1,098,303	879,391
Oil country goods	182,152	42,821	.....	957,632	789,120
Line pipe	304,440	36	.....	1,165,117	761,511
Mechanical tubing	62,473	27,016	448	363,166	295,813
Pressure tubing	25,826	4,587	1,705	123,403	80,999
Wire (drawn)	274,151	4,711	2,625	1,112,577	991,339
Nails & staples	49,562	.....	.....	204,036	223,952
Wire (barbed & twisted)	8,708	.....	.....	36,809	59,320
Woven wire fence	30,215	.....	.....	117,230	149,211
Bale ties	5,384	.....	.....	17,196	16,498
Black plate	94,031	.....	.....	322,996	253,028
Tin plate (hot dipped)	138,556	.....	.....	410,723	354,989
Tin plate (electrolytic)	554,575	.....	.....	1,959,560	1,543,917
Sheets (hot rolled)	758,303	37,254	2,413	3,294,689	3,088,181
Sheets (cold rolled)	1,172,163	5,172	13,481	5,099,116	4,854,716
Sheets (galvanized)	266,728	.....	.....	1,100,382	888,159
Sheets (other coated)	20,549	.....	.....	91,138	85,598
Sheets (enameling)	Not available; included in cold-rolled sheets				96,316
Electrical sheets & strip	11,007	65,474	.....	300,363	248,659
Strip (hot rolled)	155,433	2,911	377	686,686	677,216
Strip (cold rolled)	125,611	1,764	16,827	623,875	507,546
Total (1956 to date)	7,206,375	519,368	58,130	31,091,205	.....
Total (1955 to date)	6,767,315	454,219	57,787	.....	26,677,965

SEEKING A COMPETITIVE EDGE ON WEST COAST BUSINESS?

This may be your answer. Here's a Pacific Northwest plate and sheet fabricator with an AAA-1 rating, 56 years of experience, a modern 70,000 sq. ft. plant and the ability to serve as a subcontractor affording you a valuable "on the spot" competitive advantage on fabricating work for the expanding Western market. Serving you is a skilled organization with a comprehensive background in fabricating carbon steel and alloys ranging in thickness from sheet to 1" plate and light structural forms. For complete information call or write:

Attn. Mr. George T. Dexter
PUGET SOUND FABRICATORS, INC.
3470 E. Marginal Way
Seattle 4, Wash.

EXPERIENCED STEEL MAN WANTED

MAINTENANCE SUPERINTENDENT

Excellent opportunities with a steel plant specializing in electric furnace production and rolling of high quality killed carbon and alloy steels.

Apply by letter stating complete qualifications and salary expected. All communications will be held in strictest confidence. Address inquiries to:

BOX 437, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

Accounts Wanted

MANUFACTURER'S REPRESENTATIVE. Well established in Cincinnati area with large number of regular repeat customers in industrial field. Wants to represent on a commission basis another reputable company requiring above average representation with product or service of real merit. Write Box 436, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

METALLURGICAL SALES ENGINEERS
Rapidly expanding company located in Southern New Jersey, producing master alloys, powdered metals, alloys and minerals. Although college degree not required, some formal academic training in metallurgical or chemical fields essential. Excellent opportunity for advancement. Please submit comprehensive resume and salary requirements. Box No. 434, STEEL, Penton Bldg., Cleveland 13, Ohio.

HELP WANTED
ROLL TURNER—Merchant Bar Mills 18" and 12"—Regular and special bar sections. Furnish resume, age, experience, references and salary expected. Address Box 438, STEEL, Penton Bldg., Cleveland 13, Ohio.

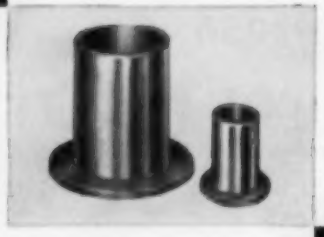
SALES CORRESPONDENT
Expanding metallurgical company located in Southern New Jersey requires sales correspondent with some technical background or experience in chemistry or metallurgy. Please send resume and salary requirements. Box 435, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.

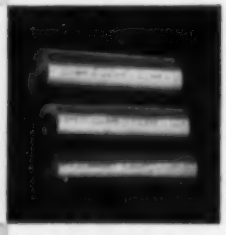
SINTERED POWDERED BRONZE BEARINGS AT THEIR *most modern best!*

Bunting's many years of experience in the manufacture and distribution of Cast Bronze Bearings gives the highest standards of precision, quality and worth to the new Bunting stock sintered Bronze Bearings. These better sintered bronze products are now available from Bunting Distributors.

Bunting's research facilities and resources are producing quality, precision and unvarying uniformity in self-lubricating bearings made of sintered powdered bronze. Plain bearings, flange bearings, thrust bearings and bars made of this increasingly popular material now can be had in sizes and standards not heretofore available from stock.



BOTH Bunting Cast Bronze and Bunting oil filled, self-lubricating sintered powdered Bronze Bearings and Bars are available to you through your nearest Bunting Distributor. He has in stock all sizes for your immediate needs. Ask him or write for complete lists and dimensional data on Bunting Cast Bronze and Bunting Sintered Bronze Bearings.



Bunting®

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL

The Bunting Brass and Bronze Company, Toledo 1, Ohio

Branches in Principal Cities • Distributors Everywhere

chemical requirement extra for manganese in the range 0.60 to 0.90 inclusive.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 122

While orders for concrete reinforcing bars are slower, a mild flurry in new contracts being estimated in New England accounts for 5200 tons, mostly for Connecticut. Steel piling is active in the area, also, and approximates 3500 tons.

Midwestern suppliers, already heavily booked for 1956, are keeping their eye on road building programs for 1957 and 1958, now that agreement has been reached by the congressional conference committee on the new federal highway program for interstate routes.

It appears Illinois may have $144 million to spend on such projects in little more than a year.

Warehouse . . .

Warehouse Prices, Page 127

Threat of a strike in the steel industry has led to a further spurt in demand for warehouse products. Distributors are able to satisfy only part of the demand for plates and structural shapes due to lack of inventories. In hot carbon bars and sheets, they are able to satisfy a larger portion of the inquiry, but even in these items their stocks are not at normal levels because business hasn't dipped too sharply over recent weeks.

Ferroalloys . . .

Ferroalloy Prices, Page 135

Prices on some chromium alloys and calcium-silicon have been advanced by Electro Metallurgical Co., New York, a division of Union Carbide & Carbon Corp. The new prices are effective immediately on a spot basis, and July 1 for contract consumers and on all shipments made on and after that date.

This table lists the products affected:

	BASE PRICE New	Old	Amount of increase
Medium-carbon ferrochrome	$0.3000	$0.2850	$0.0150
Low-carbon ferrochrome* (0.10% C grade)	0.3675	0.3600	0.0075
Low-carbon ferrochrome** (1.00% C grade)	0.3525	0.3400	0.0125
Simplex low-carbon ferrochrome*** (0.25% C grade)	0.3250	0.3175	0.0075
Exothermic ferrochrome S	0.2850	0.2650	0.0200
Exothermic ferrochrome B	0.3200	0.2900	0.0300
Exothermic silicon-chrome	0.3950	0.3700	0.0250
Calcium-silicon	0.2300	0.2150	0.0150

*Increase applies to all grades up to and including 0.50% carbon

**Increase applies to 1.00%, 1.50%, and 2.00% carbon grades

***Increase applies to all grades

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CHOICE

Take yours—

from the complete line of

JOMAC WORK GLOVES

Whatever your handling operations may be, you can choose with confidence the Jomac Gloves that are right for them. And you can be sure of getting quality—lasting quality, stemming from 18 years of pioneering and leadership in the industrial work glove field.

Jomac Work Gloves are:

- made of cut-resistant, loop-pile Jomac Cloth—the fabric that protects hands from cuts and abrasion like no other
- manufactured in knit wrist, safety cuff or gauntlet styles—in heat-resistant, flame-proof, plastic-coated types
- great for economy—can be used, cleaned or reconditioned, and reused again and again
- adaptable—many styles are interchangeable, with *4* long-wearing surfaces per pair
- rugged—*they outwear canvas gloves by a profitable margin!*

Jomac manufactures all types of hand-to-shoulder protection. The choice is yours.

FREE JOMAC CATALOG

Write us (on your company letterhead) for your free Jomac Industrial Work Gloves Catalog—and for recommendations on types of gloves to use for your handling operations. We'll gladly supply sample gloves. Address: Jomac Inc., Dept. E, Phila. 33, Pa.

JOMAC

INDUSTRIAL WORK GLOVES

PLANTS IN PHILADELPHIA, PA., AND WARSAW, IND.
IN CANADA: SAFETY SUPPLY CO., TORONTO

XVI

This is the sixteenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Copper: Its Principal Effects in Alloy Steels

One of the best known of all metals, copper certainly needs no introduction here. Its uses are legion. It is one of the best conductors of heat and electricity. It is popular with the housewife, essential to the engineer. But possibly not so well known is its very important function as an alloying element in certain types of steels. So used, copper increases resistance to atmospheric corrosion and also acts as a strengthening agent.

Since copper does not oxidize in the steel melt, it can be added at any time during the course of the heat. Pure copper melts at about 1980 deg F.

Copper is added to steel in varying amounts. The actual proportion, of course, depends upon the end product in mind. Some of the most widely used copper-bearing steels are those containing from 0.20 to 0.50 pct. In these, copper has been found to increase corrosion-resistance without materially affecting mechanical properties. It has been found, too, that paint frequently lasts longer on such steels than on the non-copper-bearing types.

Among the best known of the copper-bearing steels are the high-strength, low-alloy grades developed in recent years. Generally speaking, the ductility of steels in this group is comparable to that of conventional structural steel. The yield strength, however, is usually higher. Copper, working as a team with chromium, nickel, and phosphorus, substantially raises the level of corrosion-resistance in these steels; yet its presence does not adversely affect welding characteristics.

Copper-bearing steels are a subject in themselves, a subject in which Bethlehem metallurgists are well versed. If you would care to know more about this interesting group of steels, feel free to consult with our technicians. They will gladly work closely with you and help with any problems you may encounter. And please remember, too, when you need alloy steels of any kind, that Bethlehem manufactures the full range of AISI standard alloy grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this entire series of advertisements, Nos. I through XVI, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa. The material is now available in a convenient 32-page booklet, and we shall be very glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

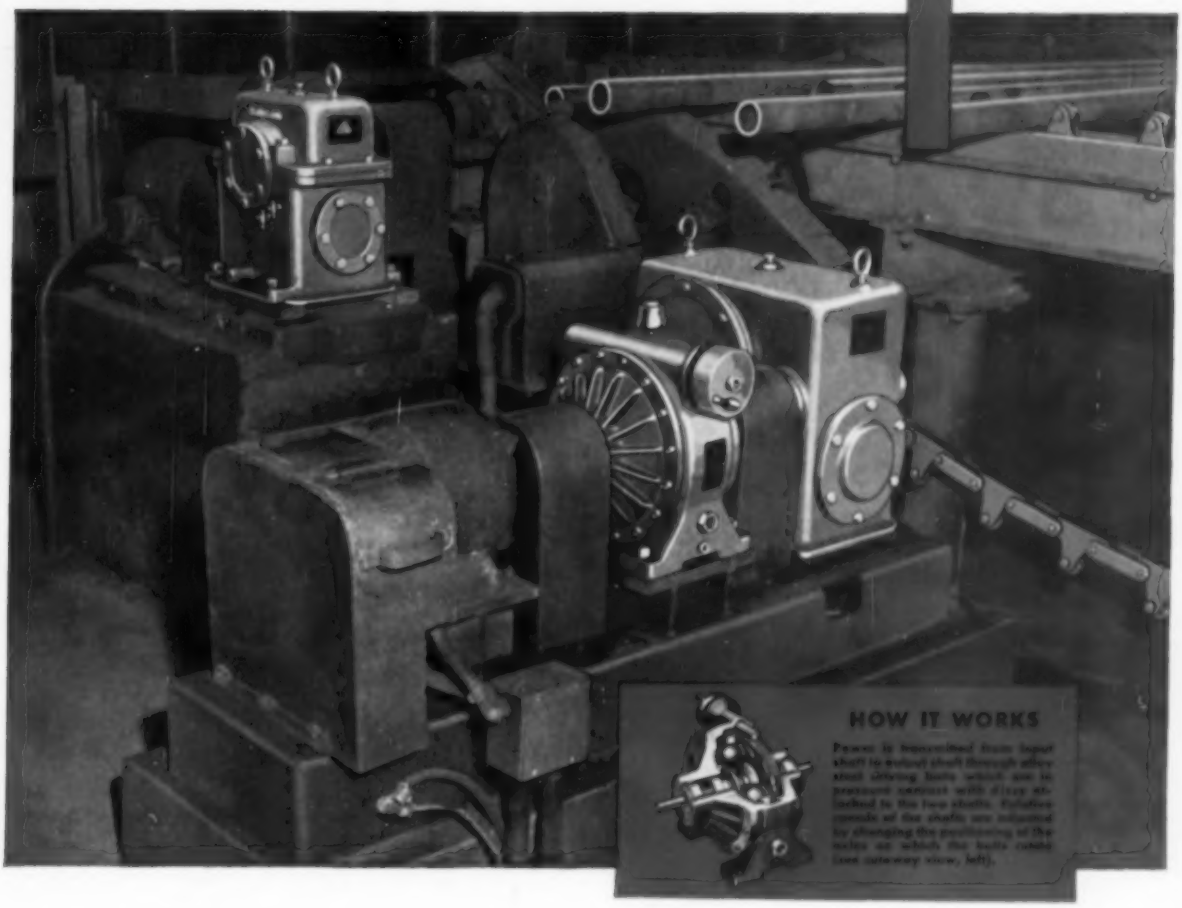
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Hot pipe conveyor travels at precision pace set by CLEVELAND Speed Variator

Drag-type conveyors utilizing Cleveland Speed Variator Size 6K4 Series 1. Driving Cleveland Double Reduction Worm Gear Size 051D Series F, ratio 900:1.



THIS hot pipe conveyor produced by York-Gillespie Mfg. Co. is a good example of the precision engineering applied in steel mill operation today. Conveyor speed has to coincide exactly with the speed of other operations on the line—has to adjust to the pace of production anywhere in the line. That's why a Cleveland Speed Variator is on the job!

Being infinitely variable, the Speed Variator gives stepless speeds over its full 9:1 range—from ⅓ to 3 times input speed. Output speed is adjusted manually by a hand wheel mounted on the Variator—but could be regulated automatically by remote controls of various types.

The Cleveland Speed Variator provides these major advantages: 1. An extremely compact unit with input and output shafts in line and rotating in the same direction; 2. Almost any input speed up to 1800 rpm can be used—either clockwise or counterclockwise rotation; 3. Rated for constant horsepower output over a 9:1 range, or for constant output torque with a 6:1 range; 4. Infinitely variable over the entire speed range; 5. Rapid response to speed change, precise adjustment, and accurate maintenance of speed settings; 6. Long life and minimum maintenance due to absence of belts or complicated linkages; 7. Ample bearing support for overhung pulleys on either input or output shafts.

This revolutionary variable speed drive is available in eighteen standard types and sizes. For detailed description of the Cleveland Speed Variator with photographs, sectional drawings, rating tables and specifications, write for Bulletin K-200.

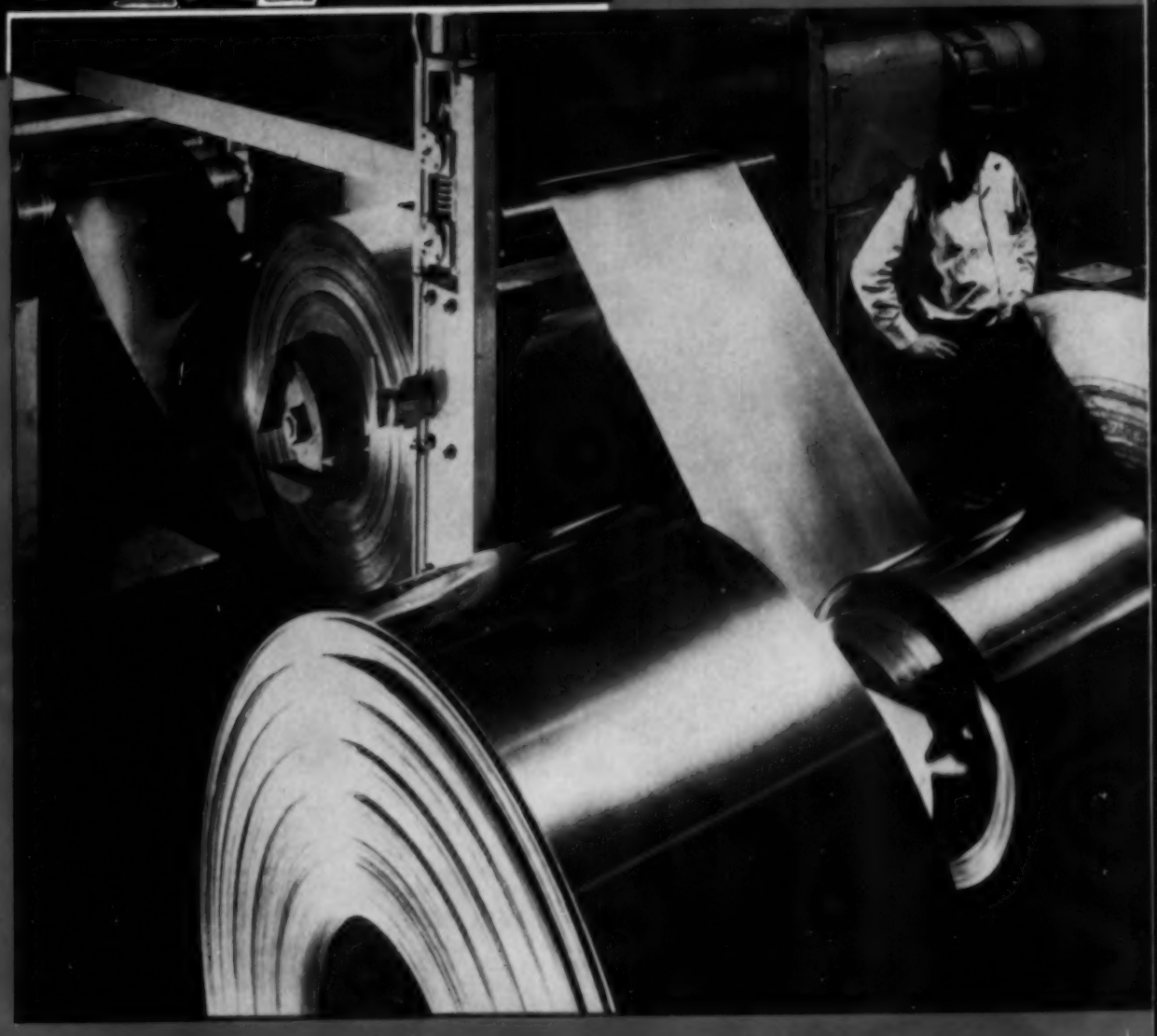
THE CLEVELAND WORM AND GEAR COMPANY

Speed Variator Division, 3270 East 80th St., Cleveland 4, Ohio

Sales representatives in all major industrial markets. In Canada—Peacock Brothers Limited.

The WEAN

ENGINEERING
Company, Inc.
WARREN, OHIO



The Wean Engineering Company, Inc., Warren, Ohio is a recognized specialist in the design and installation of sheet, tin and strip mill equipment. The expert knowledge and trained imagination of one of the world's most noted steel mill engineering firms is at your service when you specify Wean—whether the job calls for a single piece of equipment or a complete design of an entire line.

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT